Nurturing Cultures – A Cross-Cultural Perspective on the Intersection of Parenting and Teaching

by

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DEDICATION

This dissertation is dedicated to my two daughters, Emily Jayne and Elena Jean. You have made me stronger, better and more fulfilled than I could have ever imagined. I love you to infinity and beyond.

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ABSTRACT

Every society invests enormous resources to ensure that children grow up with the skills, knowledge, and values that will enable them to be successful. Yet cultures vary in their beliefs about what effective parenting and teaching require. Nurturing children involves a collaboration among parents, teachers, and students and reflects cultural beliefs about how to best foster learning. This dissertation consists of three studies that used different methods to reveal cultural beliefs about teaching and learning. Study 1 used PISA parent survey and achievement data to examine whether there are cultural differences in the kinds of parental involvement in schooling that predict children's success. We found important cross-national differences in the types of parental involvement that predicts academic success, suggesting that not all types of parental involvement are equally effective and its utility depends on the cultural context in which it occurs. We argue that these different patterns of effective parental involvement exist because school systems vary in what they expect of students, the ways in which they are open to parental participation, and the extent to which learning opportunities exist outside of schools.

Study 2 used the same international dataset to cross-culturally investigate both the students' and parents' perspectives on parental involvement in education and how these different perceptions affect academic achievement. We found that the extent to which parent and child perceptions of parental support agree depends on both the type of parental involvement examined and the cultural context involved. Cross-national differences were particularly pronounced in one type of parental involvement – parental educational spending – suggesting

that parental financial investment in education has different psychological and academic consequences for students in each cultural context.

Study 3 used an experimental approach and a new data collection method to obtain real-time data on how college students experience and learn from various aspects of teaching. We examined how students process initial perceptions and/or judgments of teachers as well as learn from the teaching quality they receive. Our results suggest that overall quality of instruction, as well as the specific teaching strategies and behaviors included in a lesson have significant consequences on both student learning and evaluation of the instruction. And contrary to what past research suggests, first impressions that teachers make in the first few minutes of a class do not matter as much as the quality of the lesson that follows. Most importantly, the continuous data collection technique used in this study has the potential to show how improving and/or reinforcing various aspects instructional strategies could change the way students learn from the same lesson.

By using such a wide range of methodological approaches, we were able to identify how different cultures organize the collaborative process of nurturing students into competent adults, and how students experience the education they receive. Taken together, the three studies examined the broader cultural context in which these nurturing efforts take place and how these different cultural models influence student learning. The results shed light on aspects of teaching and learning that are universal as well as identify unique beliefs and practices that could be used to improve our own nurturing process in the U.S.

CHAPTER 1

The Universal Question of How to Best Educate Children

Each child is an experiment, and every society invests enormous resources to ensure that children grow up with the skills, knowledge, and values that will enable them to be successful. Yet cultures vary in their beliefs about what effective parenting and teaching require, and students also must make sense of the parenting and teaching they receive. Observing the different experiences of other educational systems and cultures allows us both to understand universal problems in education and to find good ideas that can be used to inform our own practices. My dissertation uses a variety of methods to identify important cultural beliefs about teaching and parenting, as well as look at how students experience some of the practices these beliefs entail.

A striking example of how much variation there can be in beliefs about parenting comes from the first popular American guide to parenting. Consider the following child-rearing advice:

> "Let your behavior always be objective and kindly firm. Never hug and kiss them, never let them sit in your lap. If you must, kiss them once on the forehead when they say good night. Shake hands with them in the morning…" (Watson & Watson, 1928: pp.81-82).

Modern North American parents would find this advice to be ludicrous, maybe even harmful. But Bigelow and Morris (2001) suggest in their review of childrearing literature of the

1920s that this was consistent with other beliefs of that era. This shows that beliefs can vary significantly even within a single society.

Such different beliefs regarding how to best nurture and educate children are worth investigating from a cross-cultural perspective. Doing so would not only further our understanding of the broader cultural context in which learning occurs, but also shed light on the ways in which student learning can be improved. However, examining beliefs and ideas about how to optimize student learning cannot be adequately accomplished by a single survey or interview. In order to understand the process more broadly, and perhaps more thoroughly, the question needs to be addressed from multiple different angles.

In this dissertation, I examined three ideas aimed at aspects of the overall question of how best to nurture and educate children. I looked at parental involvement in education as it relates to student achievement, students' perceptions about parental educational support and its consequences, and cultural ideas about teaching practices and how those are received by students. The dissertation consists of three separate studies, each using different methods to look at one aspect of this overall question. I used a combination of large-scale data analysis and experimental designs to not only examine this question on a broad scale, but also in a laboratory setting where ideas can be tested in a controlled manner.

In study 1, we used a large-scale international dataset to examine beliefs about parental involvement in education. The goal of this approach was to identify patterns that exist across cultures. First, we examined the relationship between parental background variables and parental involvement to see if any household SES factors influence the ways in which they are involved in their children's education. Then we looked at the relationship between parental involvement

and students' academic success to see how the kinds of parental involvement in schooling that predicts children's academic success differs across countries.

Study 2 used the same dataset to examine whether parental involvement as reported by parents correspond with students' perceived parental educational support. By looking at multiple perceptions related to parental involvement, we were able to better understand the impact that parental involvement has on student academic outcomes.

Study 3 looked experimentally at how differences in teaching are experienced by students and reflected in their learning. We used a continuous data collection technique to obtain real-time responses related to students' level of learning during a lesson so we could identify and isolate specific aspects of teaching that measurably influence student learning and evaluation of the instruction.

To the extent that these studies – each with very different techniques and limitations – converge on similar results, we can have confidence that we have a better understanding of how cultures differ in their beliefs about successful parenting and teaching, the ways that the practices that lead to student achievement differ among societies, and how students experience and learn from different teaching practices.

CHAPTER 2

Does the Type of Parental Involvement that Predicts Success Vary Across Countries? Findings from PISA 2015

Abstract

Parents play an important role in their children's schooling, and studies in the U.S. have generally found a positive relation between parental involvement and student success. But is this relation between parental involvement and student success a universal phenomenon? Using PISA 2015 data, we examined whether and how the kinds of parental involvement associated with better learning vary across cultures. We also looked at how parental SES is related to both parental involvement in education and student achievement in different countries. Our results reveal that across the two surveyed East Asian settings (Hong Kong and Korea), parental SES, especially household income is a stronger predictor of parental involvement compared to the two West European countries (Belgium and Germany) examined in this study. There are also important cross-national differences in the types of parental involvement that predict academic success, suggesting that not all types of parental involvement are equally effective and its utility depends on the cultural context in which it occurs. We argue that these different patterns of effective parental involvement exist because national school systems vary in what they expect of students and in the ways in which they are open to parental participation.

Introduction

The importance of parental involvement in a child's education has been consistently emphasized in educational literature (Epstein, 2001; Kim, 2002; Lareau, 1989). Studies in the U.S. have generally found that parental involvement in education is positively associated with student outcomes. However, the strength of evidence varies across different outcome measures, and the relation to educational outcomes is not consistent. Whereas some research has demonstrated that parental involvement in education is positively associated with adolescents' academic outcomes (e.g., Catsambis, 2001; Hill et al., 2004), others have found negligible effects (e.g., Balli, Wedman, & Demo, 1997; Bronstein, Ginsberg, & Herrera, 2005). Results can vary as a function of the kind of outcome variable used, the type of parental involvement assessed, and the age of students included.

Because much of the research on parental involvement has been done with middle class families in the U.S., research often fails to account for the varying opportunities to be involved that different school systems provide to parents. Some recent cross-cultural research (Borgonovi & Montt, 2012) suggests that the relation between parental involvement and student outcomes may vary substantially across cultures.

In this study, I use large-scale international surveys to examine whether or not different parental involvement patterns exist in different cultures. Then I investigate how parental involvement is related to student academic outcomes, and whether this relationship varies across countries. I seek to answer the following question: Is there one pattern of parenting that predicts student success everywhere, or are there different patterns of parental involvement associated with student success across cultures?

What is Parental Involvement in Education?

Bronfenbrenner's ecological theory (Bronfenbrenner, 1979) provides a framework for thinking about the multiple ways in which societies attempt to promote children's development, as well as the varying forms that parental involvement may take in different societies. Bronfenbrenner describes the environment in which children develop in terms of a set of nested socially organized subsystems. Although developmental psychologists tend to focus on the individual child and his or her relations with caregivers (what Bronfenbrenner termed the "individual" and "microsystem" levels of analysis), children's education is affected by larger cultural forces such as neighborhoods and schools ("mesosystem"), which in turn exists within a culture that may promote particular educational outcomes and affect the opportunities parents have to be involved in their children's education.

Parental involvement in children's education can vary according to whether it occurs at home or in the context of the school system. Because schools are not the only contributors to children's education, another type of parental involvement can involve investment in outside of school education for their children. Each of these forms of parental involvement will be reviewed next.

Home-Based Involvement

Home-based involvement refers to parental reinforcement of learning at home (Hill & Tyson, 2009). This form of parental involvement has been advocated because it reaffirms the knowledge and instruction received at school, thereby helping students to retain what they have learned (Comer, 1995). Research also suggests that home-based parental involvement enhances and encourages learning motivation (Hoover-Dempsey & Sandler, 1997).

Home-based parental involvement can take many different forms. Current literature defines home-based involvement as having three major dimensions: a) behavioral involvement, which includes active connections between home and school, such as assisting with homework; b) cognitive-intellectual involvement, which refers to providing various educationally stimulating activities; and c) personal involvement, which includes attitudes and expectations about school and education (Grolnick & Slowiaczek, 1994).

As with other areas of parental involvement, the bulk of research on home-based involvement has been done in North America. Cross-cultural differences can exist in the kinds of involvement strategies parents employ, as well as in societal expectations for the nature and amount of parental involvement. For instance, Chen and Stevenson (1989) argue that the amount of time parents or other family members help their child with homework varies significantly across the Chinese, American, and Japanese cultures. Of these cultures, Chinese students were reported as receiving the greatest amount of parental assistance, followed by the U.S. (Chicago sample) and Japan. In addition to the amount of parental involvement, the nature of parental involvement can vary across cultures as well. In a more recent study, Cheung and Pomerantz (2011) examined the nature of parents' involvement in the U.S. and China and found that in the U.S., parental involvement behaviors were accompanied by increased autonomy support. In other words, the more parents were involved in education, the more autonomy supportive they were. But in China, parental involvement behaviors were accompanied by increased psychological control.

Cultural differences in parental involvement also exist within the American context. Huntsinger and Jose (2009) argue that the types of parental involvement typically employed differs across Asian Americans and European Americans in the U.S. While European American

parents tend to volunteer more in schools, Chinese American parents focus more on systematic teaching of their children at home. In other words, parent involvement of the cognitive-intellectual type is seen as more important among Chinese American parents compared to their European American counterparts. People are mobile and yet carry aspects of their home culture with them and this can be seen in both cultural beliefs and practices of the immigrant populations in the U.S. Thus, comparing parental involvement among different groups that have immigrated to the United States can provide one window into cultural differences in parental involvement.

Cultural differences in parental involvement stem from different cultural ideologies about learning and parents' role in it (Cheung & Pomerantz, 2011). Ideas about the role of parents in children's learning, as well as the access to and the types of educational experiences offered all vary across cultures. This is manifested in both quantitatively and qualitatively different parental involvement as seen by cross-cultural research. But how these differences translate to student achievement remains unclear.

School-Based Involvement

Parents can also play an important role in their children's educational lives by participating in school-based activities. This can take many forms, including meetings with teachers or school principals and volunteering in school activities. Since school-based involvement depends heavily on the opportunities that schools provide for involvement, large differences exist across schools, school districts, and countries (EACEA Eurydice, 2005). Some of the most seminal work in this field (e.g. Epstein, 1987; Connors & Epstein, 1995; Epstein & Sanders, 2002) has focused on this form of parental involvement and demonstrates its key role in promoting student learning, and potentially even closing demographic gaps in achievement. The frameworks of Comer's (1995) School Development Program has also promoted parent-teacher

relations and parent participation in schools as a way to improve student outcomes. These studies argue that parent-teacher interactions and other general school exposures help to increases parents' knowledge about the curriculum, which in turn may encourage the effectiveness of involvement at home (e.g., Comer, 1995; Epstein, 2001; Hill & Taylor, 2004). It has also been argued that these interactions can positively influence teachers as well, by creating mutual respect between teachers and parents, and increasing teachers' perceptions about how much parents value education (Comer, 1995; Epstein, 2001).

Most of the research in this field, however, focuses on North American school contexts. It does not account for the varying opportunities that different school systems provide to parents in ways to be involved, let alone the academic consequences of the resulting differences in parental involvement.

Studies examining cultures outside the U.S. suggest that the positive influence of school-based parental involvement may not be universal. In some cultures, parental involvement geared towards establishing teacher-parent relations and parent-school relations is perceived as being not as important, or even unfavorable (e.g. Lee, 2005; Park, Byun, & Kim, 2011; Sy, 2006). And such differences might translate differently to students' academic outcomes. In order to better understand the ways in which schools can help promote parental involvement, further research in different cultural contexts is warranted.

Educational Spending

In examining parental involvement in Korea, Park, Byun, and Kim (2011) described a distinctive kind of parental involvement that is highly prevalent in East Asian locations such as South Korea, Japan, and Taiwan, but not typically discussed in studies in the U.S. They examined the extent to which parents are engaged in activities related to private tutoring,

including the amount of money spent towards education, efforts geared towards gathering information on different kinds of supplemental education activities available, and choosing and monitoring such educational activities.

Paid private tutoring (also referred to as "shadow, or supplementary education") used to supplement formal schooling has become a widespread phenomenon in a number of countries. In East Asian countries, in particular, various forms of private tutoring activities are utilized by a vast majority of students (Baker, Akiba, Letendre, & Wiseman, 2001). South Korea is known to have the largest private tutoring infrastructure (Baker and LeTendre, 2005), also known as '*hagwon*'. In 2008, about eight out of ten primary and secondary students in Korea were enrolled in at least one kind of private tutoring (Korea National Statistical Office [KNSO] 2008), which translates to about 20 trillion Korean Won (approximately $17 billion USD) spent on private tutoring activities annually. In another survey conducted by the Seoul Metropolitan Government in 2008, parents in Korea spent an average of about $550 per student each month on private tutoring services, accounting to about 16 percent of their monthly household income.

Studies show that the shadow education sector also plays an important role in Japan's education system (e.g. Cave, 2001; Dierkes, 2010; Roesgaard, 2006). These educational institutions, also known as 'yobiko' or 'juku' (cram school) are attended by children from preschool age all the way through the end of secondary education. It is estimated that parents in Japan, on average, spend between $65USD and $1,000USD per month on various forms of shadow education (Dierkes, 2010).

Taiwan is another place known for its large supplementary education system. Liu (2012) argues that cram schooling is an experience that the majority of Taiwanese children have while growing up, and that no social stratification is apparent when it comes to its participation. In

other words, regardless of income, a majority of parents in Taiwan (approximately 70%) enroll their children in some type of private tutoring activities (Liu, 2012).

There is also evidence of growing popularity of private tutoring (or shadow education) in other parts of the world, including North America, Eastern Europe, Southeast Asia, and several African countries (Dang & Rogers, 2008). It is clear that this is becoming an important avenue of parental involvement, both in terms of money being spent, as well as selecting and monitoring of activities. Park et al. (2011) argue that private tutoring can be seen as a third sector of education besides home and school because of the substantial role it plays in educating students. And because these educational activities can be quite costly, parents typically invest a lot of their time and effort to gather information before choosing which activities may be most beneficial. This is an area that requires substantial parental involvement because there is a great deal of variation in type and quality of private tutoring. For instance, there are individual tutoring services that are provided by one instructor to a student or a group of students. There are also self-study sheets that are regularly prepared and delivered by various private companies, with occasional instructor visits. Other forms of private tutoring include private for-profit cram schools where major subjects such as math, English, and Korean are taught in classroom-like settings, and online tutoring services, where lessons are shared via videos.

Given the costs and parental time associated with it and its substantial prevalence in primary and secondary education in some parts of the world, it makes sense to consider private tutoring as a form of parental involvement, particularly in the context of cross-cultural research. In this paper, the umbrella term, "educational spending" is used to refer to involvement in all types of private tutoring and other private educational activities. And the amount of parental

involvement (e.g. time) in private tutoring activities is used synonymously with the amount of money spent, given the private, for-profit nature of these educational activities.

Parental Involvement and Achievement

Existing research on the relationship between parental involvement and achievement shows mixed findings. Whereas some research has demonstrated that parental involvement in education is positively associated with adolescents' academic outcomes (e.g., Catsambis, 2001; Hill et al., 2004), others have found negligible effects (e.g., Balli, Wedman, & Demo, 1997; Bronstein, Ginsberg, & Herrera, 2005). Results can vary as a function of the kind of outcome variable used, the type of parental involvement assessed, the age of students included, and the cultures examined.

According to a meta-analysis conducted by Hill & Tyson (2009), the type of parental involvement makes a difference when it comes to academic achievement. They found that the type of involvement found to have the strongest positive relation with achievement is academic socialization. Academic socialization refers to parents' communication of their expectations for achievement and value of education, the extent to which they foster educational and occupational aspirations in their adolescents, the extent to which they discuss learning strategies with children, and whether or not they make preparations and plans for the future (Hill & Tyson, 2009). Generally speaking, involvement in the form of parent-child communication appears to be the most effective in the American cultural context.

Effects of parental involvement also vary by the age of the child. Hill and Tyson (2009) found that school-based involvement is associated with American elementary children's achievement. They argued that this may be because such involvement is likely to include visits to the classroom and interactions with children's teachers, which can increase parents' knowledge

about the curriculum, enhance social capital, and promote effectiveness of involvement at home (Comer, 1995; Epstein, 2001; Hill & Taylor, 2004; Hill & Tyson, 2009). But they concluded that this may not be the case for middle school students. In middle schools, school-based involvement has been shown to change from assisting in the classroom to attendance at school activities (Seginer, 2006). This shift is less likely to provide opportunities for middles school parents to learn about the pedagogy and classroom content, which leads to fewer opportunities to create mutual respect between parents and teachers. Hill and Tyson (2009) explain that this may be because when communication between parents and teachers decreases, its potential to influence academic achievement also decreases substantially. Davis-Kean and Eccles (2005) also agree that even though both parents and teachers would like more interaction, it often becomes more difficult to achieve in secondary schools due to the increased number of teachers that parents have to deal with, which in turn makes it difficult for teachers to get to know their students very well.

As discussed above, ethnic and cultural variations exist in how parental involvement influences children's academic outcomes in the U.S. Unfortunately, prior research on ethnic differences in parental involvement has reported mixed support for this claim. Whereas some research has found that the relation between parent involvement and achievement is stronger for African Americans than European Americans (e.g., Hill et al., 2004), others found that the relationship is weaker for this ethnic group (e.g., Seyfried & Chung, 2002). Jeynes (2007) argues that the relationship between parental involvement and achievement was positive for ethnic minorities, but the strength of the relation was not compared across ethnicities. As of now, it is not clear as to whether ethnic/racial variations actually exist in how parental involvement influences achievement in the U.S.

Cross-national comparisons also challenge the idea that parental involvement in school-based activity leads to better achievement. Looking at data from PISA 2009, Borgonovi & Montt (2012) found that in most countries surveyed, children whose parents discussed their child's behavior or progress with a teacher showed poorer performance in reading than children whose parents did not have such discussions. This may be because parents are more likely to consult with their teachers if their children are not doing well. However, this pattern, according to PISA, extends to parental involvement in volunteer activities as well. In about half of the countries included in the parent involvement survey, children whose parents volunteered in extra-curricular activities were found to have lower reading scores.

The mixed results suggest that the type of school-based parental involvement, rather than merely doing something in schools, may be what matters the most. Additionally, the inconsistencies may be due to the fact that parental involvement can take different forms and have different meaning in different cultures.

The Current Study

Starting with the 2006 wave of data collection, the Programme for International Student Assessment (PISA) included a parent survey that asked questions about parental involvement in student learning. Only a subset of countries and economies participated in the parental survey – 16 in 2006, 15 in 2009, 11 in 2012, and 18 in 2015, but they represent a range of different regions and educational systems. Because PISA focuses on 15 year olds, results will not capture effects of parental involvement that might be limited to elementary school students. PISA chose to focus on 15 year olds because this is an age where students are making key decisions that will affect their educational and occupational futures, so this is a critical age for understanding the factors that relate to educational success.

This study uses the most recent available parental survey from PISA 2015 to look cross-culturally at three different types of parental involvement: a) home-based involvement, b) involvement in schools, and c) educational spending.

This study seeks to answer two questions. First, it examines the relationship between household background variables and parental involvement to see if parental socioeconomic factors influence the ways in which they are involved in their children's education. These relationships are compared cross-nationally to explore any cultural differences that might exist in this regard. We decided to examine parental SES variables in relation to parental involvement behaviors because studies in the U.S. suggest a positive correlation between SES and parental involvement (e.g., Brody & Flor, 1998; Lareau, 1989; Stevenson & Baker, 1987), and numerous intervention efforts are geared towards helping lower SES parents to become more involved (e.g., Reynolds, 1994; Reynolds, Ou, & Topitzes, 2004). We not only wanted to see if this is a universally valid claim, but also to ascertain how these SES variables each predict the different types of parental involvement behaviors defined above.

Next, we looked at how the different types of parental involvement are related to students' academic achievement, and whether this relation varies across countries. In other words, is there a "magic formula" when it comes to parental involvement? Or, alternatively, do the kinds and amounts of parental involvement associated with student success vary across cultures? Overall, this study takes a comprehensive approach to investigate the detailed relationships among SES variables, parental involvement, and academic achievement, and how these relationships vary across countries. As measures of student success, we looked at PISA student achievement results for mathematics, science, and reading collected as part of the main PISA assessment.

Method

Dataset

Parent survey data and corresponding student achievement scores from the PISA 2015 study were used. In total, 18 of the 72 countries and economies participating in the PISA assessment reported parental survey results. I selected two of the three participating East Asian locations (Hong Kong-China & Korea), and two from Europe (Belgium & Germany) to comparatively analyze how parental involvement differs across cultures and how these differences relate to student achievement outcomes.

Table 2.1. *Sample sizes for completed parental questionnaires from selected countries participating in PISA 2015*

Country	Sample Size
Belgium	4715
Germany	3398
Hong Kong	5246
Korea	5546

Parental Education. Section 1 of the PISA 2015 main student questionnaire (section 1: you, your family, and your home) contains items for both mother's and father's education level. The responses range from 1 to 5, with 1 being the highest level of education offered by a given country and 5 being the lowest level of education. The labels for each country are created based on the ISCED (International Standard Classification of Education) of the OECD. The responses were reverse coded to reflect a higher number equating to a higher level of education.

Household Income. Section F of the parent questionnaire for PISA 2015 contains one question asking the participating parents to indicate their annual household income. The respondents were asked to add together and report the total income, before tax, from all members of the household.

Student Achievement. Achievement scores provided by PISA 2015 were used. To help generalize the findings, achievement scores from three academic domains, math, science, and reading were used.

School-Based Parental Involvement. School-based involvement can also take many forms, but generally involves parent-teacher contact, meetings to discuss child's progress, and volunteering in various school affairs (EACEA Eurydice, 2005). This scale was based on 10 items in Section B of Parent Questionnaire for PISA 2015. The scale includes questions about teacher-parent discussions/meetings (e.g., 'discussed my child's progress with the teacher on my own initiative') and various volunteering activities in the school (e.g., 'volunteered in extra-curricular activities such as book club, school play, sports, field trip'). The responses for each item were measured based on either 'yes' or 'no'. The total standardized score provided by the PISA data was used.

Home-Based Parental Involvement. Home-based involvement refers to parental reinforcement of learning at home (Hill & Tyson, 2009), and includes activities such as discussing educational progress and expectations with the child, assisting with homework, and providing learning opportunities to stimulate cognitive growth. This scale was based on 8 items in Section A of the Parent Questionnaire for PISA 2015. The scale includes questions about parent-child discussions (e.g., 'discuss how well my child is doing at school), assistance with homework (e.g., 'help my child with his/her mathematics homework'), and provision of educational materials and opportunities (e.g., 'obtain math materials, such as applications, software, study guides, for my child'). The responses for each item were measured using the following: 1 = never or hardly ever, 2 = once or twice a year, 3 = once or twice a month, 4 = once or twice a week, 4 = everyday or almost everyday.

Educational Spending. Parents were asked to report educational expenses, including tuition fees for school, fees paid to teachers, private tutoring services, as well as any fees for cram school. This item was included in Section E of Parent Questionnaire for PISA 2015. The responses for each item were measured using the following: 1 = nothing, 2 = more than $0 but less than $W, 3 = $W or more but less than $X, 4 = $X or more but less than $Y, 5 = $Y or more but less than $Z, and 6 = $Z or more (The letters represent appropriate dollar amounts scaled for each country based on purchasing power parity, PPP).

Data Analysis

Missing Values. The missing cases for all the independent and dependent variables included in this study are shown in Table 2.2. For parental involvement, missing values make up approximately 31 percent of the dataset for school-based involvement, 30 percent for home-based involvement, and 33 percent for educational spending. Logistic regression with missing as dependent variable (missing in school-based parental involvement yes/no) revealed four significant variables associated with missing status of school-based parental involvement: the three achievement scores and household income. Logistic regression with home-based involvement (missing yes/no) revealed two significant variables associated with missing status: mother's and father's education. Logistic regression with educational spending (missing yes/no) revealed four significant variables associated with missing status: father's education, math, science, and reading achievement. But since all those variables were included in all model estimations, we are confident that the missingness process can be described as missing at random within our statistical model (Little & Rubin, 2002).

Table 2.2. *Missing cases across all variables included in the analysis (PISA 2015).*

Variables	Valid	Missing	% Missing
Parental Involvement			
Home Involve	18,905	8,190	30.23
School Involve	18,811	8,284	30.57
Ed Spending	18,177	8,918	32.67
Mother Education	24,827	2,268	8.30
Father Education	24,323	2,772	10.23
Household Income	16,003	11,092	40.94
Achievement			
Math	27,095	0	.00
Science	27,095	0	.00
Reading	27,095	0	.00

Multiple Group Structural Equation Modeling. In this study, we hypothesized that there would be a moderated mediation effect[1] between parent SES variables (education, household income) and student achievement, with parental involvement as a mediator and culture as a moderator among these relationships. To test this, Mplus software was used to run a multiple group structural equation model. Findings from 4 locations, Belgium, Germany, Hong Kong, and Korea, were examined to investigate cross-national differences in the relationships among parental education, household income, parental involvement, and student achievement in math, science, and reading. Based on the theoretical linkages found in existing literature, a structural equation model was designed as shown in *Figure 2.1.*

[1] Moderated mediation effect occurs when the effect of an independent variable on an outcome variable via a mediator variable differs based on levels of a moderator variable.

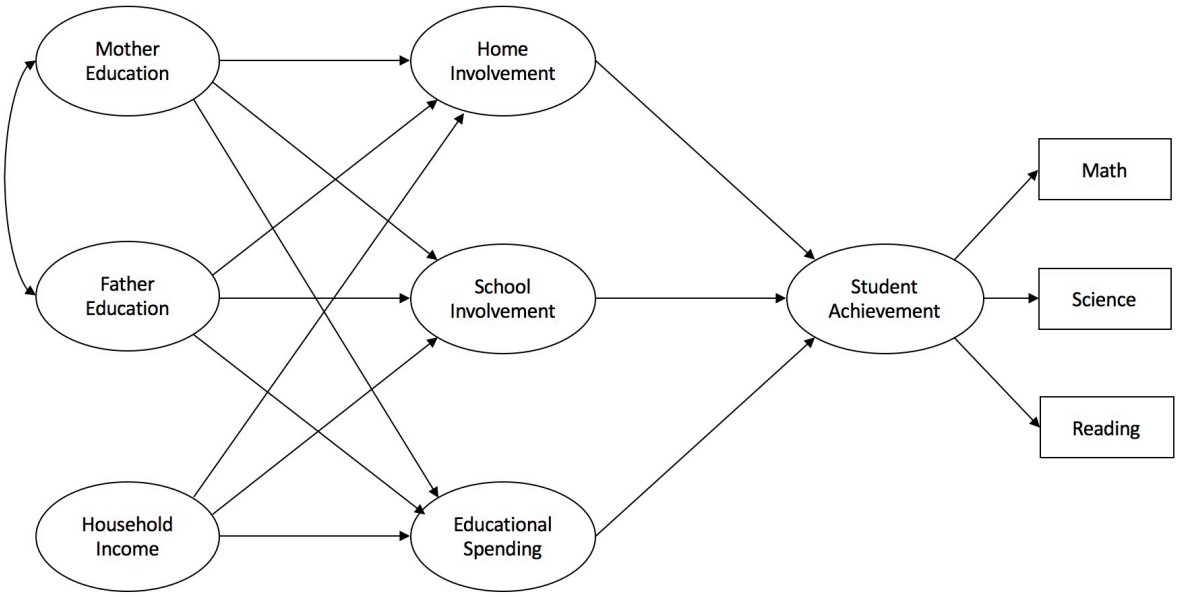


Figure 2.1. The hypothesized theoretical model of the relationships among parental SES variables, parental involvement, and student achievement.

In this model, the three types of parental involvement variables were included to mediate the effects of the three parental SES variables (mother education, father education, and household income) on student academic achievement in math, science, and reading. The home-based parental involvement variable was measured by an average score of 8 items pertaining to parent's home activity/behavior reports. The school-based parental involvement variable was an average score of 10 items pertaining to parent's participation in various school-related activities. The educational spending variable was measured by one item included in the parent questionnaire that reports the amount of money paid to schools, teachers, tutoring services, or cram schools. The response options for this item reflects different dollar amounts scaled for each country based on purchasing power parity, PPP.

Results

Descriptive Statistics

Tables 2.3 and 2.4 provide descriptive information for the samples. Note that although the mean scores for all 4 locations are quite similar to one another, Germany and Korea report the highest level of school-based parental involvement, while Germany exhibits the highest level of home-based parental involvement. On the other hand, Korea scores the lowest in home-based parental involvement, followed by Hong Kong. Finally, Belgium appears to be spending the most money on education, including private tutoring, and other forms of supplementary education, followed by Korea. As seen in Table 2.4, students from Hong Kong has the highest achievement scores in math, science, and reading, followed by Korea, Germany, and Belgium.

Table 2.3. *Descriptive statistics: Parental involvement* (PISA 2015)

	School-Based		Home-Based		Education Spending	
Country	Mean	SD	Mean	SD	Mean	SD
Belgium	1.32	.22	3.09	.59	4.23	1.32
Germany	1.40	.24	3.32	.57	3.09	1.54
Hong Kong	1.38	.26	3.03	.73	3.16	1.22
Korea	1.40	.29	2.89	.66	3.32	1.36

Table 2.4. *Descriptive statistics: Academic achievement* (PISA 2015)

	Math		Science		Reading	
Country	Mean	SD	Mean	SD	Mean	SD
Belgium	510.56	95.91	505.03	100.05	502.51	99.21
Germany	507.99	88.88	512.27	98.54	512.35	98.68
Hong Kong	550.03	88.93	525.89	80.22	528.72	84.72
Korea	523.78	99.59	515.08	95.15	514.45	98.24

Correlations

Table 2.5 contains correlations between the three types of parental involvement and academic achievement in math, science, and reading for all 4 countries combined. In this combined sample, school-based parental involvement was negatively correlated ($p < .01$) with

academic achievement in math (r = -.053), science (r = -.053), and reading (r = -.063). On the other hand, home-based parental involvement was positively correlated (p <.01) with math, science, and reading achievement at r = .027, .056, and .030, respectively. The largest significant correlations are between educational spending and achievement, ranging from r = .110 to r = .127.

Table 2.5. *Correlations between academic achievement and parental involvement (all countries)*

Parental Involvement/Achievement	Math	Science	Reading
School Involvement	-.056	-.053	-.063
Home Involvement	.027	.056	.030
Ed Spending	.127	.110	.119

Note. All correlations are significant at p<.01.

When examining these correlations by country (see Table 2.6), the cross-national differences, particularly between the European (Belgium and Germany) and the two East Asian countries (Hong Kong and Korea) are noteworthy. In both Belgium and Germany, both school-based and home-based parental involvement are either slightly negatively correlated or not statistically significant (at p < .01). In both countries, the negative correlations between school-based involvement and academic achievement are consistent, ranging from r = -.134 in Belgium to r = -.319 in Germany. In Germany, home-based parental involvement and educational spending are either not significantly correlated or very weakly correlated (less than r = .10). On the other hand, in both Hong Kong and Korea, educational spending is positively correlated with all three academic subjects, ranging from r = .151 to r = .311. In Korea, all three types of parental involvement are positively correlated with academic achievement.

Table 2.6. *Correlations between academic achievement and parental involvement (by country)*

Country	Parental Involve/Achievement	Math	Science	Reading
Belgium	School Involvement	-.134	-.143	-.188
	Home Involvement	-.006 (ns)	.039	-.006(ns)
	Ed Spending	.025 (ns)	.037	.043
Germany	School Involvement	-.319	-.277	-.275
	Home Involvement	-.160	-.118	-.140
	Ed Spending	-.080	-.057	-.012(ns)
Hong Kong	School Involvement	-.074	-.051	-.072
	Home Involvement	.065	.053	.021(ns)
	Ed Spending	.188	.160	.151
Korea	School Involvement	.134	.127	.128
	Home Involvement	.110	.124	.110
	Ed Spending	.311	.263	.276

Note. All correlations are significant at $p<.01$. unless marked with (ns).

Multiple Group Structural Equation Modeling

The Model Fit. To evaluate how well the proposed model fits the dataset in the four countries included in this study, the model fit was first examined. During this process, two different models – the constrained and unconstrained model – were compared to examine the extent to which the hypothesized models fit the given datasets. In the constrained model, the effect of parental education and household income on student achievement was set to be fully mediated by the three forms of parental involvement. In other words, this model did not allow direct paths between parental education and student achievement, and between household income and student achievement after controlling for the mediation. In the unconstrained model (*Figure 2.2*), direct paths from both parental education and household income to student achievement were added, along with the existing mediated paths.

The model fit indices shown in Table 2.7 suggests that the unconstrained model is a better fitting model for the given data. In the constrained model, the model fit indices indicate a moderate fit, $X^2(91) = 7164.20, p < .001$, *CIF*=.93, *RMSEA*=.11. However, when the direct

paths are allowed, the model fit improved significantly. In the unconstrained model, the model fit indices indicate a noticeably better fit, $X^2(76) = 4076.20$, p<.001, *CFI*=.96, *RMSEA*=.09. A chi square difference test additionally indicates that the model has significantly improved by the release of the constraints, $X^2(15) = 3088$, p<.001. Due to these results, the parameter estimates of the unconstrained model were used.

Table 2.7. *Model Fit Comparison*

Model	X^2	df	Δdf	ΔX^2	CFI	TLI	RMSEA
Constrained Model (Model 1)	7164.20	91			.93	.88	.11
Unconstrained Model (Model 2)	4076.20	76	15	3088.00**	.96	.92	.09

**p<.05, **p<.01*

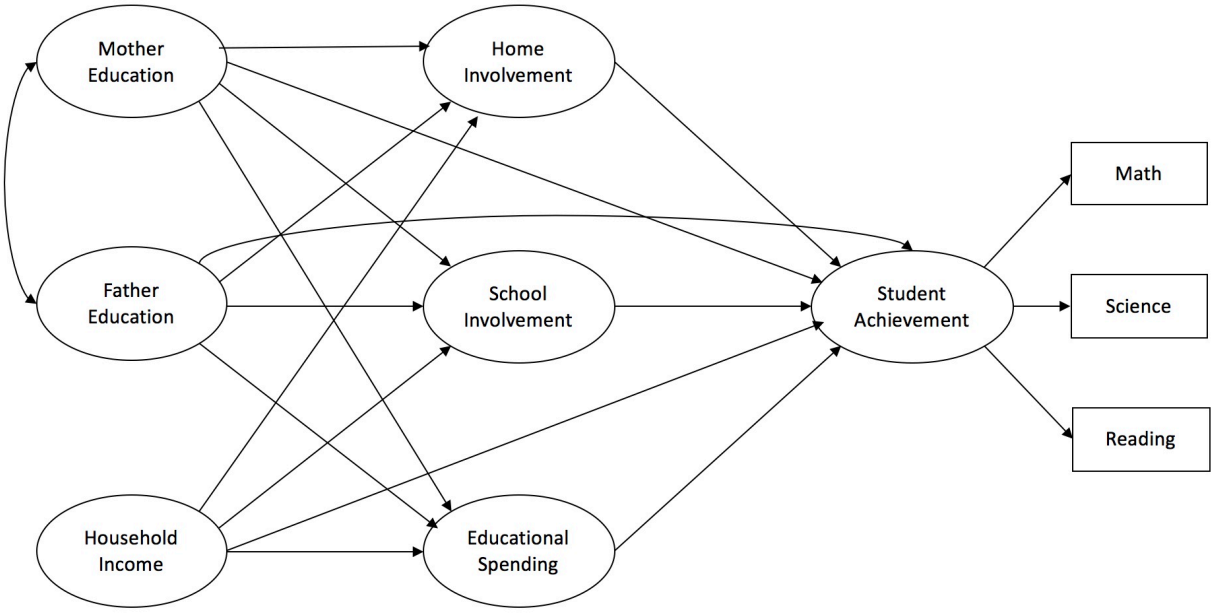


Figure 2.2. The new structural model with direct paths between parental involvement and student achievement.

SES and Parental Involvement. Our final structural equation model examined by country indicated varied relationships among the SES variables, parental involvement, and academic achievement. Specifically, in Belgium and Germany, mother's and father's education

are, in general, not significant predictors of parental involvement. Household income is a statistically significant positive predictor of home-based parental involvement in Belgium at .10 ($p < .01$) and a positive predictor of educational spending in Germany at .08 ($p < .01$).

SES variables are stronger predictors of parental involvement in the two East Asian samples included in our study (Hong Kong and Korea) compared to their European counterparts (see *Figures 2.3~2.6*). In Hong Kong, the three SES variables, including mother's education, father's education, and household income are all significant positive predictors of parental involvement. In particular, household income is a strong positive predictor of educational spending (.33), suggesting that parents with higher annual incomes are likely to spend more money on their children's education, including tuition for private schools, cram schools, and private tutoring. In Hong Kong, this model explains about 6 percent of the total variance in home-based involvement, .4 percent of school-based involvement, and 19 percent of educational spending. A similar trend can be seen in the Korean sample, where the largest predictor of parental involvement, particularly educational spending, is household income (.50), and the model explains about 2 percent of total variance in home-based involvement, 5 percent of school-based involvement, and 27 percent of educational spending. In Korea, household income is also a significant positive predictor of home-based parental involvement (.13) and school-based parental involvement (.20). Overall, the final model explains substantially more of the total variance of parental involvement in the two East Asian countries, compared to their European counterparts.

SES and Achievement. The model parameters suggest that the direct paths between mother's education and student achievement, father's education and student achievement, and household income and student achievement are statistically significant at $p<.001$ for all 4

countries, but to varying degrees. In Belgium and Germany, the direct effect of mother's education on student achievement (in math, science, and reading) are .20 and .15, respectively. The direct effect of father's education on student achievement is slightly smaller, at .14 in Belgium and .09 in Germany. The direct effect of household income on student achievement is also significant, at .29 in Belgium and .29 in Germany.

In the two East Asian locations Korea and Hong Kong, the direct effects of parental education and household income on student achievement are noticeably smaller, ranging from .01 to .14. Specifically, in Hong Kong, mother's education does not have a statistically significant direct effect on student achievement, while father's education has a statistically significant, but small direct effect, .09, $p<.001$. In Korea, education level of both parents have a significant effect on student achievement, with mother's education having a bigger impact at .13, compared to father's, at .05. Although statistically significant, these effects are noticeably smaller than the two European samples surveyed. In these two East Asian countries, household income also has a noticeably smaller direct effect on student achievement, at .13 and .14, respectively, compared to their European counterparts.

Parental Involvement and Achievement. The model parameters suggest that the extent to which parental involvement predicts student academic achievement also varies across the country samples. Cross-national differences are particularly pronounced between the two East Asian countries (Hong Kong and Korea) and the two European countries (Belgium and Germany) in our sample. In both Belgium and Germany, parental involvement is a relatively weak predictor of student achievement, with all three types of involvement yielding effects between .01 to .24. Specifically, both home-based parental involvement and educational spending did not have a significant effect on student achievement in Belgium and statistically

significant, but small effects (-.07 and -.06 each) in Germany. In both countries, school-based parental involvement had a negative effect on student achievement, β= -.14 and -.24, respectively. The final model explains about 27 percent of variance in student achievement in both Belgium and Germany (see *Figures 2.3 & 2.4*). A detailed table of parameter estimates, factor loadings, and total variance explained is presented in Appendix A.

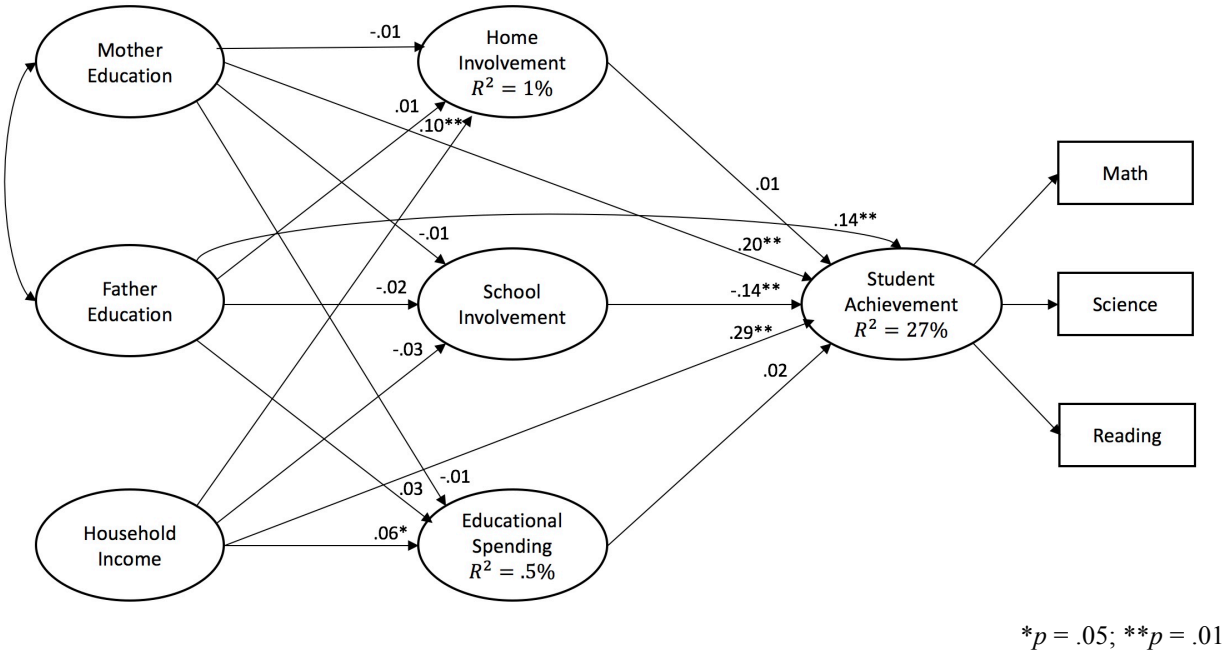


Figure 2.3. Belgium: Final model parameter estimates (standardized).

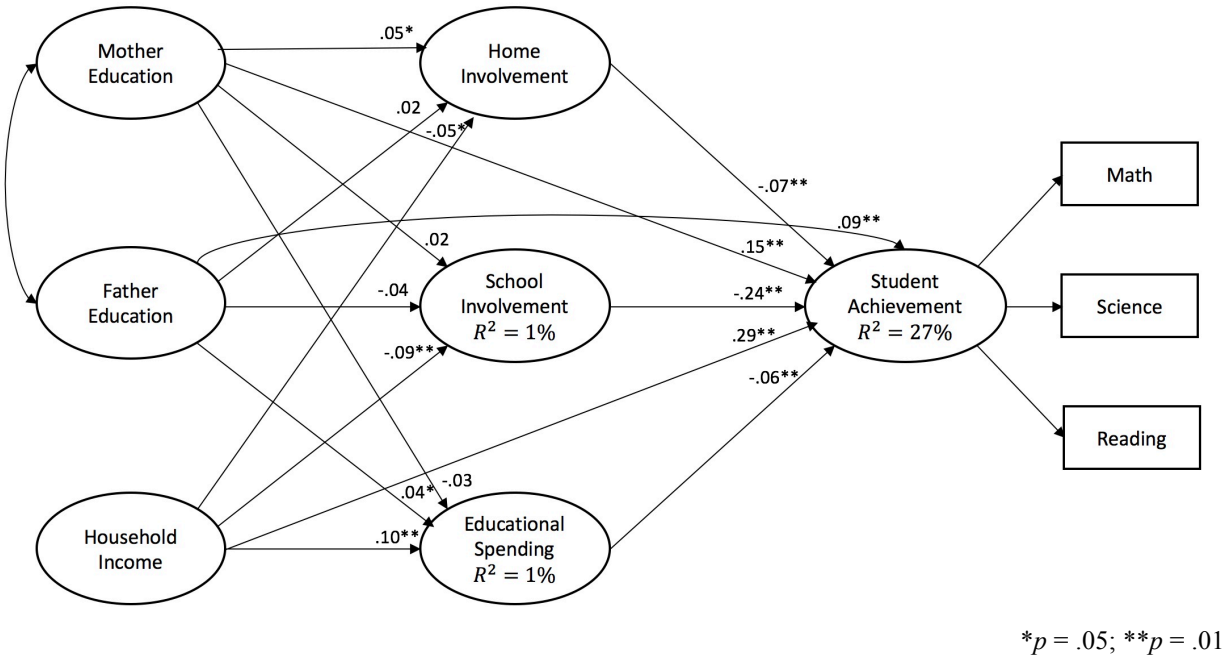
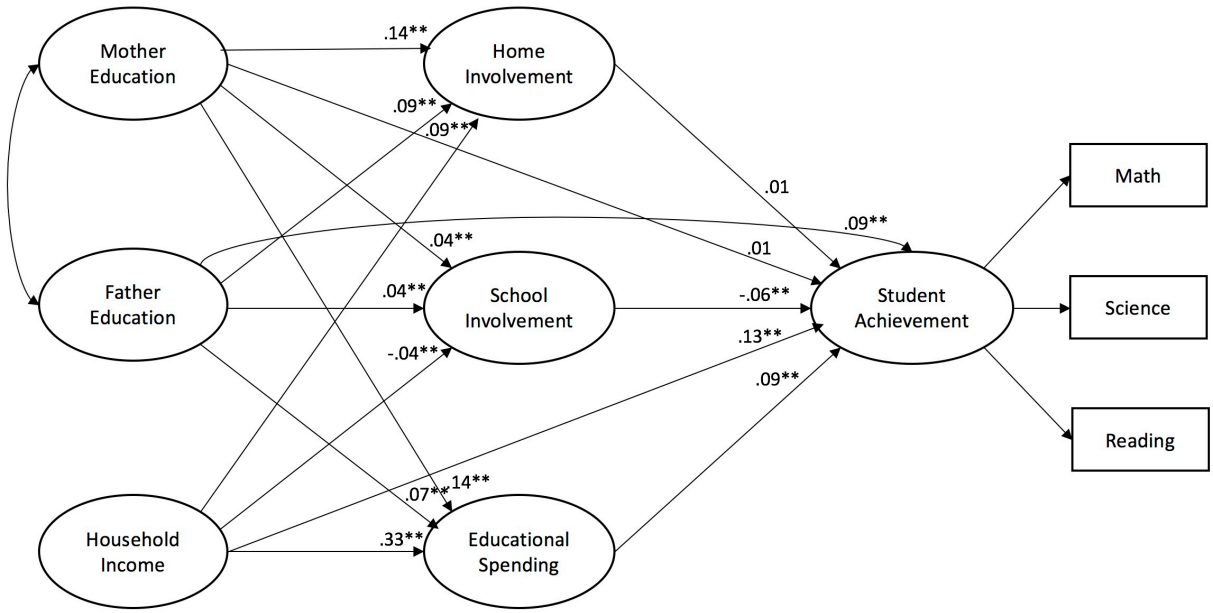


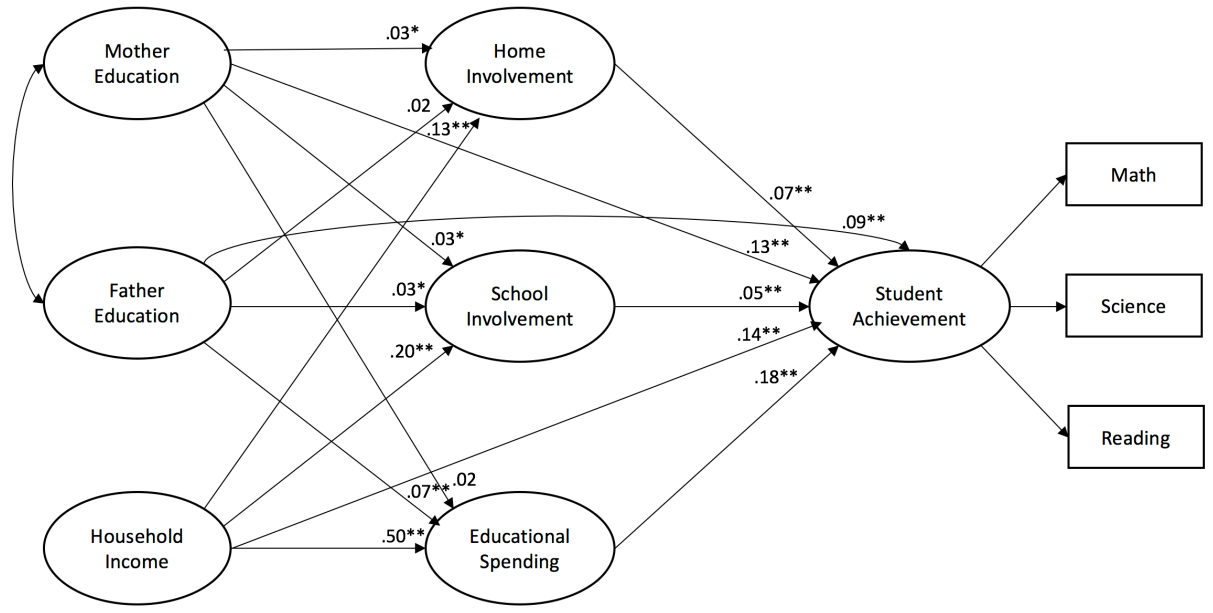
Figure 2.4. Germany: Final model parameter estimates (standardized).

In Hong Kong and Korea, on the other hand, parental involvement, especially educational spending, is a significant predictor of student academic achievement (see *Figures 2.5* and 2.*6*). In Hong Kong, school-based parental involvement is a significant negative predictor of academic achievement, at -.06 and educational spending is a significant positive predictor at .09. In Korea, all three forms of parental involvement are positive predictors of academic achievement, with educational spending being the strongest predictor, at .18 (p<.01). The final model explains about 6 percent of total variance in student achievement in Hong Kong, and 14 percent of variance in Korea.



*p = .05; **p = .01

Figure 2.5. Hong Kong: Final model parameter estimates (standardized)



*p = .05; **p = .01

Figure 2.6. Korea: Final model parameter estimates (standardized).

Discussion

Previous research has found mixed results regarding the relationship between parental involvement and student outcomes. This study focuses on the cross-cultural variations that exist in the relationship between parental involvement in education and student academic achievement. In line with previous research, we found important cross-national differences in the relationship between parental involvement and student academic achievement. Differences were also noted in the relationship between parental demographic factors, including education level and household income, and parental involvement, as well as between parental involvement and student academic achievement.

First, we found that cultural differences exist in the relationship between SES and parental involvement. SES has often been a variable of interest in studies of parental involvement in the U.S. and the results have been mixed (Fan & Chen, 2001) as with most other research on parental involvement. But many American researchers have argued that SES and parental involvement are positively related (Brody & Flor, 1998; Lareau, 1989; Stevenson & Baker, 1987), and this connection has often served as a rationale for specific intervention programs (e.g., Balli, 1996; Reynolds, 1994; Reynolds, Ou, & Topitzes, 2004). In this study, we found that parental education and household income predict parental involvement behaviors in different ways depending on cultural context. In the two East Asian settings (Hong Kong and Korea), parental SES, especially household income, was a strong predictor of parental involvement, but this was not the case with our European samples (Belgium and Germany). This may reflect inherent cultural differences in both the opportunities to be involved outside of schools and the need for parents to be involved above and beyond the education provided by public schools.

We also found some important cross-national differences in the types of parental involvement that predicts academic success. In the two European countries (Belgium and Germany), all three types of parental involvement included in the model had either a small negative or insignificant effect on student academic achievement in mathematics, science, and reading. We speculate that this may be due to the reactive nature of parental involvement in response to student academic struggles. That is, parents are more likely to either consult with a teacher to discuss a child's academic progress or help out with homework if a child is struggling academically. Our results suggest that this is particularly true with school-based parental involvement behaviors.

In Hong Kong and Korea, one type of parental involvement, educational spending, has vastly different consequences on student achievement outcomes than it does in European settings. While in both Belgium and Germany, educational spending does not predict achievement outcomes, in both Hong Kong and Korea, educational spending is a large positive predictor of student achievement in math, science, and reading. In fact, East Asian parents' spending on tuition related expenses, private tutoring, and cram schools yields much larger returns on student academic achievement when compared to any other type of parental involvement, including being involved at home or at school. The predictive nature of educational spending on student achievement is most pronounced in Korea.

This may be reflective of both the wide array of supplementary education options available in these countries and the insufficient public school system that creates a need for it. South Korea, in particular, is known to have the largest private tutoring infrastructure in the world, and students heavily rely on them to be successful in school and to prepare for the national college entrance exam. Such a reliance is perpetuated by the hyper-competitive

educational climate where students are driven to believe that anything outside of educational attainment holds little value and their ultimate goal is to get into one of only a handful of nationally recognized colleges in the country. Unfortunately, the substantial association between educational spending and parents' SES raises concerns about educational equity. Higher SES parents with more economic and human resources are probably more likely than lower SES parents to succeed in finding and affording high-quality private tutoring and cram schools for their children, which in turn likely influences their children's academic performance. This is an issue that Korea is currently trying to battle, although there does not seem to be a quick solution to this decades-old issue that has only worsened in the recent years (Park, Byun, and Kim, 2011).

It is evident that there is no magic formula that universally applies to all parents when it comes to being involved in education. Instead, culture matters, and parents work within the constraints that their culture imposes. For one, school systems provide different opportunities for parental involvement. They vary in what they expect of students and in the ways in which they are open to parental participation. Such variations inevitably lead to cultural differences in the extent to and the ways in which parents are involved in their children's education.

Second, parental values, particularly those related to education, along with their goals for child's future, will inevitably influence the types and the amount of parental involvement they take part in. These values not only vary across individuals within a country, but also across cultures. For example, in most East Asian cultures influenced by Confucian traditions, people tend to value disciplined study and tend to be more competitive and status-conscious (Liu, 2012). This is seen by a traditional Chinese saying that goes, "all pursuits except studying are of little value." In fact, Liu (2012) explains that such 'credentialism' has existed in East Asia for a very long time (Wang & Lin, 1998). And even today, unparalleled respect for education, and

achievement in particular, can be readily seen in East Asian cultures. Studies by Hwang (1994) and Chang et al. (1996) found that in East Asian cultures, educational background is the most important standard in evaluating a person's social status, even more so than occupation or income. This explains why parents from these cultures would do anything in their power to ensure that their children receive the highest quality of education possible, even if it means going beyond their means to invest in expensive cram schools.

On the other hand, in Western cultures, social status is determined more by income or occupation than education level. Such differences inevitably lead to cultural variations in the amount, as well as the ways in which parents will be involved in their children's education (Liu, 2012).

Third, opportunities for education outside of schools matter as well. Whether or not such systems are in place influences the ways in which parents are involved in their child's education. In countries where large private education systems (including private tutoring and cram schools) are in place, parents are more likely to choose these activities to supplement their children's education and are willing to pay for it – if they can. But if such systems are absent and/or parents delegate the responsibility for academic success of their children to the schools, parental income or education level would neither predict involvement nor achievement.

It is evident that the kinds of parental involvement that predicts academic success depends on a broader cultural context. And because cultures vary in terms of the goals that parents have for their children, values that the society fosters, and educational opportunities provided, there is no magic formula that can apply to all cultures. Nonetheless, cross-cultural investigations are highly valuable and this study has advanced our understanding of the complicated processes through which parental involvement benefits students.

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CHAPTER 3

Parent vs. Child Perspectives in Parental Involvement in Education: A Cross-Cultural Perspective

Abstract

Studies of parental involvement in a variety of cultural contexts show that the relationship between parental involvement and student outcomes depends on the specific local context of family and education. This study extends our understanding of this relationship by adding one more dimension to the equation – how students experience their parents' involvement behaviors – and how these experiences translate to academic outcomes. Our findings suggest that the extent to which parent and child perceptions of parental support agree depends on both the type of parental involvement examined and the cultural context involved. In general, we found that there is a higher level of correspondence between parental involvement behaviors as reported by parents and students' perceived parental support in the two East Asian locations included in our study (Hong Kong and Korea) compared to the two Western European countries (Belgium and Germany). The differences were particularly pronounced in one particular type of parental involvement – parental educational spending – such that in both Hong Kong and Korea, parental financial investment in education translated to students feeling more supported educationally. We argue that these culturally different patterns reflect the cultural norms surrounding parental roles in education and the opportunities afforded to them by the education system as a whole (including both formal and shadow schooling).

Introduction

Research on parental involvement in education and its consequences on student outcomes has increased dramatically in the last few decades (Hill & Tyson, 2009). But limited attention has been paid to this topic from perspectives other than that of parents. A majority of parental involvement measures in this body of literature are either self-report constructs reported by the parents themselves (e.g., Bronstein, Ginsberg, & Herrera, 2005; Borgonovi & Montt, 2012) or perceived parental support/involvement reported by teachers (e.g., El Nokali, Bachman, Votruba-Drzal, 2010). But how students perceive and experience their own parents' involvement and the consequences these perceptions might have on their own outcomes have yet to be investigated.

It is important to examine parental involvement from the student's point of view because people's thoughts and actions are often based on their own perception of a situation and other's behaviors (Demo et al., 1987), not how others describe it or an observer perceives it. That is, the extent to which parental involvement influences student outcomes may be limited to how students perceive parental support, not how parents reflect on their own supportive behaviors. Therefore, the ways in which students experience parenting may be what is most important, and adolescents are old enough to report these experiences. Evidence of incongruence between parent and child reports of parental behavior also warrants additional research looking at student perceptions of parental support and its consequences.

In this study, we used large-scale international surveys to cross-culturally examine the relationship between parental involvement in education and student academic outcomes. We compared the students' own reports of perceived parental educational support with parent reports of their own involvement efforts to examine to what extent the two perceptions concur, and how

each of the perceptions relate to student academic outcomes. We also sought to investigate any cross-cultural differences in this regard. We sought to answer the following two questions: 1) Do students and parents agree on their reports of parental involvement in education? and 2) which perception matters more when it comes to student academic outcomes?

Parental Involvement in Education

Parental involvement is typically defined as parents' interactions with schools and with their children to promote academic success (Hill et al., 2004; Hill & Tyson, 2009). While a majority of parental involvement research in the American context uses a definition similar to this one, many also use the distinction to differentiate between school-based and home-based involvement strategies (e.g., Epstein, 1987; Conners & Epstein, 1995; Comer, 1995). Although this is useful as it distinguishes between policy-relevant realms, namely home and schools (Hill & Tyson, 2009), it fails to take into account another important form of involvement – parental investment in supplementary learning outside of schools. In fact, past research typically frames parental investment in terms of the time spent on educationally supportive activities. But given the increasing popularity and substantial prevalence of supplementary education, including private tutoring, cram schools, and other learning institutions, the financial side of parental investment needs to be acknowledged as well. This is even more important when looking at parental involvement from an international perspective, as shadow education has become the norm, rather than an optional activity, in many parts of the world. In this study, parental involvement is defined as consisting of three different types: home-based involvement, school-based involvement, and educational spending. Each of these forms of parental involvement are reviewed next.

School-Based Parental Involvement. Studies in the American schooling context have established that parental involvement, especially in schools, has a positive influence on school-related outcomes for children (e.g., Hill & Taylor, 2004; Grolnick & Slowiaczek, 1994). This is because at least within an elementary school context, school-based involvement is likely to increase parent-teacher interactions, which can increase parents' knowledge about the schooling process and the effective ways to be involved (Comer, 1995; Epstein, 2001; Hill & Taylor, 2004). Parental school involvement includes activities that are structured by and often performed at school such as volunteering, communicating with teachers and other school personnel, attending school events such as parent-teacher associations (PTAs), and parent-teacher conferences (Hill & Taylor, 2004).

Epstein and colleagues (Epstein, 1987; Conners & Epstein, 1995; Epstein & Sanders, 2002) demonstrate the key role that parental school involvement plays in promoting student learning, and in closing the economic and racial achievement gap. These studies argue that parent participation in schools is beneficial for both parents (and their children) and teachers alike. For parents, general school exposures and parent-teacher interactions in particular may help to increase their knowledge about the school and its curriculum, which in turn may encourage them to be more involved at home. Not surprisingly, parent school involvement is a key component of effective intervention program. For example, Comer's (1995) School Development Program promotes parent-teacher relations and parent participation in schools as a way to improve student outcomes. For teachers, these parent-school interactions can be beneficial because it creates a mutual respect between teachers and parents. It can also inform teachers about the value that parents place on education (Epstein, 2001).

But school-based involvement depends heavily on the opportunities that schools provide for parents to be involved. And since differences exist in this regard across schools, school districts, states, and in particular, between countries, the positive effects identified in empirical studies (mainly from the US) may not be generalizable.

Home-Based Parental Involvement. Home-based involvement generally refers to parents engaging in educational activities at home, or reinforcement of learning at home (Hill & Tyson, 2009). This form of parental involvement has been advocated because it not only encourages learning motivation when children receive assistance and support with school work at home (Hoover-Dempsey & Sandler, 1995; Cooper, 1989), but also helps provide structure for free time and promotes additional extracurricular learning opportunities outside of schools (Fan & Chen, 2001).

Grolnick and Slowiaczek (1994) distinguish three major dimensions of home-based involvement – behavioral involvement, cognitive-intellectual involvement, and personal involvement. Behavioral involvement refers to parents making active connections between home and school, such as assisting with homework; cognitive-intellectual involvement refers to providing educationally stimulating activities; personal involvement refers to attitudes and expectations about school and about education in general (Grolnick & Slowiaczek, 1994).

Educational Spending. In addition to involvement opportunities in schools and at home as outlined above, parents differ also in their educational spending which directly or indirectly affects parental involvement. Affluent parents can afford private tutors, travel, or expensive school supplies (e.g., a microscope). In many countries, wealth allows one partner to stay at home and devote a substantial amount of time monitoring and supporting their children's academic progress. This type of involvement is highly prevalent in East Asian settings such as

South Korea, Japan, Hong Kong, and Taiwan. Specifically, it refers to the extent to which parents are engaged in activities related to private tutoring, including the amount of money spent on education, efforts geared towards gathering information on different kinds of supplemental education activities available, and activity choosing and monitoring such educational activities (Park, Byun, & Kim, 2011).

Although its prevalence is concentrated in parts of East Asia, there is evidence that private tutoring (or shadow education) is growing in popularity worldwide, including North America, Eastern Europe, Southeast Asia, and several African countries (Dang & Rogers, 2008). Given the increasing popularity and substantial prevalence of this form of education in both primary and secondary education worldwide, it makes sense to consider private tutoring as a form of parental involvement, particularly in the context of cross-cultural research. In this paper, the umbrella term, "educational spending" is used to refer to involvement in all types of private tutoring and other private educational activities. And the amount of parental involvement (e.g. time) in private tutoring activities is used synonymously with the amount of money spent.

Parental Involvement and Achievement

In the last few decades, the amount of research on parental involvement in education has increased substantially, but inconsistent findings have resulted from them. In fact, a meta-analysis by Hill and Tyson (2009) refers to parental involvement research as a "growing but disaggregated body of research" that uses so many different types of methods that it is simply difficult to draw firm conclusions about its effectiveness. Although proponents of parental involvement have continually argued for its positive impact on student outcomes, results can vary as a function of the kind of outcome variable used, the type of parental involvement assessed, and the age of students included in the study (Hill & Tyson, 2009).

While some studies show that parental involvement in education is positively associated with students' academic outcomes (e.g., Catsambis, 2001; Hill et al., 2004), others found no relation between parental involvement and achievement (e.g., Balli, Wedman, & Demo, 1997; Bronstein, Ginsberg, & Herrera, 2005). Some authors argue that although its link to academic outcomes may be small, parental involvement may nonetheless have a positive influence on students' behavioral outcomes (e.g., Park, Byun, &Kim, 1011; Kim, 2011; Domina, 2005; McNeal, 1999).

In addition to the outcome variables measured, the varied age of the samples can also produce mixed results in parental involvement research. Despite consensus about the importance of families and schools working together across all developmental stages, Singh et al. (1995) demonstrated that the strength of the relationship between parental involvement and achievement declines between elementary and middle schools. Whereas some aspects of parental involvement grow in importance as children grow older, others decrease in both amount and importance. For example, the importance of school-based involvement declines in both amount and effectiveness during middle school whereas other types of involvement not typically accounted for in extant frameworks, such as parental support and involvement at home, often increase in significance (e.g., Chao, Kanatsu, Stanoff, Padmawidjaja, & Aque, 2009). Therefore, it is important to identify such changing patterns of parental involvement without conflating their effectiveness across all age groups.

Cross-cultural differences are seldom a focus of research on parental involvement research. But not only do ethnic and subcultural variations exist within the US-American context in terms of how parental involvement influences children's academic outcomes (e.g., Hill et al., 2004; Seyfried & Chung, 2002; Jeynes, 2007), cross-national comparisons also challenge the

scientific consensus that parental involvement in school-based activity always leads to better achievement. Based on data from PISA 2009, Borgonovi & Montt (2012) noticed that students in about half of the countries surveyed did not benefit from parents volunteering at schools. In fact, students whose parents volunteered at school or discussed progress or behavior with a teacher actually often showed poorer performance in reading than children whose parents did not have such involvement.

The competing findings outlined above demonstrate that apart from type of parental involvement, age and cultural context play a major role in a comprehensive understanding of the role that parents play in their children's academic success. One additional important factor to consider in parental involvement research is the potential disagreement between parents and children in their reports of parental involvement behaviors, which can have major consequences on the way we view parental involvement.

Parent Reports vs. Child Reports of Parental behaviors (Parent-Child Agreement on Parental Behaviors)

Assessing parental behaviors involves examining one or more of the following perceptions: parental behaviors as reported by parents, parental behaviors as reported by children, and parental behaviors as reported by an observer. The goal is to precisely assess the actual behaviors that take or took place and studies typically look at reports of either parents or students and assume they are veridical. However, discrepancies can exist between measures reported by different parties involved. Studies suggest that parental reports of their behaviors can differ noticeably from those of their children (e.g. Demo et al., 1987; Gecas & Schwalbe 1986; Schaefer and Keith, 1985; Schwarz et al., 1985; Tein, Roosa, & Michaels, 1994). Similarly, because people are never neutral observers of matters that have consequences for their self-

conceptions (Gecas & Schwalbe, 1986), parents may recast the reality of their own parenting efforts in line with internalized norms or expectations of others (Rosenberg, 1979). Children, on the other side, might be prone to attribution errors or show limited capability of perspective taking. Both children and parents are likely to give reports that are to a degree inaccurate due to bias. Which of these perceptions should be the preferred measure when assessing parental involvement in education?

Gecas and Schwalbe (1986) looked at the relationship between parental behavior as reported by parents and children's perceptions of parental behavior and the effects both perceptions each have on various aspects of children's self-evaluations, including self-esteem. The authors found a stronger relationship between adolescents' perceptions of parental behaviors regarding support, autonomy granting, and participation and adolescents' self-esteem compared to parent reports of their own behavior. In fact, they found that parents' reports of their behavior had very little association with children's self-esteem, and only a modest correspondence was found between parents' reports of behavior and children's perceptions of those behaviors. These findings are consistent across studies conducted in the U.S.

The Current Study

Studies highlighting the lack of correspondence between parent and child reports of parental behaviors are somewhat troublesome considering that most studies in parental involvement research rely on parent report measures to assess their actual involvement behaviors. Parental behaviors, or the extent to which they are involved in education, are most likely to produce the intended positive consequences if they are perceived or defined similarly by the child and parent. And not accounting for both perspectives, especially the child's, can threaten the validity of the results.

This study attempts to more thoroughly and precisely examine the influence of parental involvement on student academic outcomes by investigating simultaneously the child's and parent's perspectives on parental involvement in education and how these different perceptions affect academic achievement. We hypothesized that students' perceived parental support would mediate the relationship between parental involvement and achievement, and that this relationship would differ cross-nationally. To test this, we used Structural Equation Modeling to run a set of multiple group models for the purpose of identifying any cross-national differences in the proposed relationship.

Method

Dataset

Parent survey data and corresponding student achievement scores from the PISA 2015 study were used. In total, 18 of the 72 countries and economies participating in the PISA assessment reported parental survey results. We selected two East Asian locations (Hong Kong-China and Korea), and two from Western Europe (Belgium and Germany) to cross-culturally analyze how parents' and students' perceptions about parental involvement relate to one another and how these different perceptions in turn relate to student academic outcomes.

Table 3.1. *Sample sizes for completed parental questionnaires from selected countries participating in PISA 2015.*

Country	Sample Size
Belgium	4715
Germany	3398
Hong Kong	5246
Korea	5546

Student Achievement. Achievement scores provided by PISA 2015 were used. To help generalize the findings, achievement scores from three academic domains, math, science, and reading were used.

Perceived Parental Support (Student Survey). 4 items from the student questionnaire were included. The items assess the extent to which the students feel that their parents are interested in school activities, as well as support and encourage their educational efforts and achievements.

School-Based Parental Involvement (Parent Survey). School-based involvement can take many forms, but generally involves parent-teacher contact, meetings to discuss child's progress, and volunteering in various school affairs (EACEA Eurydice, 2005). This scale was based on 10 items in Section B of Parent Questionnaire for PISA 2015. The scale includes questions about teacher-parent discussions/meetings (e.g., 'discussed my child's progress with the teacher on my own initiative') and various volunteering activities in the school (e.g., 'volunteered in extra-curricular activities such as book club, school play, sports, field trip'). The responses for each item were measured based on either 'yes' or 'no'. The total standardized score provided by the PISA data was used.

Home-Based Parental Involvement (Parent Survey). Home-based involvement refers to parental reinforcement of learning at home (Hill & Tyson, 2009), and includes activities such as discussing educational progress and expectations with the child, assisting with homework, and providing learning opportunities to stimulate cognitive growth. This scale was based on 8 items in Section A of the Parent Questionnaire for PISA 2015. The scale includes questions about parent-child discussions (e.g., 'discuss how well my child is doing at school), assistance with homework (e.g., 'help my child with his/her mathematics homework'), and provision of

educational materials and opportunities (e.g., 'obtain math materials, such as applications, software, study guides, for my child'). The responses for each item were measured using the following: 1 = never or hardly ever, 2 = once or twice a year, 3 = once or twice a month, 4 = once or twice a week, 4 = everyday or almost everyday.

Educational Spending (Parent Survey). Parents reported educational expenses, including tuition fees for school, fees paid to teachers, private tutoring services, as well as any fees for cram school. This item was included in Section E of Parent Questionnaire for PISA 2015. The responses for each item were measured using the following: 1 = nothing, 2 = more than $0 but less than $W, 3 = $W or more but less than $X, 4 = $X or more but less than $Y, 5 = $Y or more but less than $Z, and 6 = $Z or more (The letters represent appropriate dollar amounts scaled for each country using purchasing power parity, PPP).

Data Analysis

Missing Values. The missing cases for all the independent and dependent variables included in this study are shown in Table 3.2. For parental involvement, missing values make up approximately 31 percent of the dataset for school-based involvement, 30 percent for home-based involvement, and 33 percent for educational spending. For the four items pertaining to students' perceived parental support, missing values make up between 5.28 and 5.61 percent of the dataset. Logistic regression with missing as dependent variable (missing in perceived parental support yes/no) revealed three significant variables associated with missing status: home-based parental involvement, math achievement, and reading achievement. Logistic regression with parental involvement (missing yes/no) revealed six significant variables associated with missing status: the three achievement scores in math, science, and reading, and three out of the four perceived parental support items. Since all those variables were included in

all model estimations, we are confident that the missingness process can be described as missing at random within our statistical model (Little & Rubin, 2002).

Table 3.2. *Missing cases across all variables included in the analysis*

Variables	Valid	Missing	% Missing
Perceived Parental Support			
Interest in school activities	25,664	1,431	5.28
Support in ed efforts/achievements	25,604	1,491	5.50
Support during difficulties	25,595	1,500	5.54
Encourage confidence	25574	1,521	5.61
Parental Involvement			
Home Involve	18,905	8,190	30.23
School Involve	18,811	8,284	30.57
Ed Spending	18,177	8,918	32.67
Achievement			
Math	27,095	0	.00
Science	27,095	0	.00
Reading	27,095	0	.00

Multiple Group Structural Equation Modeling. In this study, we hypothesized that there would be a moderated-mediation effect between parental involvement and achievement, with students' perceived parental support as a mediator among these relationships, and culture as a moderator. To test this, Structural Equation Modeling was used to run a set of multiple group models with across-group parameter constraints. First, a fully mediated structural equation model as shown in *Figure 3.1* was estimated with one-sample (combining the four country samples) to examine the model fit. Then, the same models were re-run as multi-group models with country (Belgium, Germany, Korea, and Hong Kong) as grouping variable. This allowed us to explore parameter differences between countries based on the most restrictive model (full mediation).

Next, a second model allowing direct paths between parental involvement and student academic achievement was tested and compared across the four country samples. This model was tested to examine whether parental involvement behaviors as reported by parents themselves

have a direct influence on student achievement, an indirect influence mediated by how students perceive their involvement/support efforts, or both.

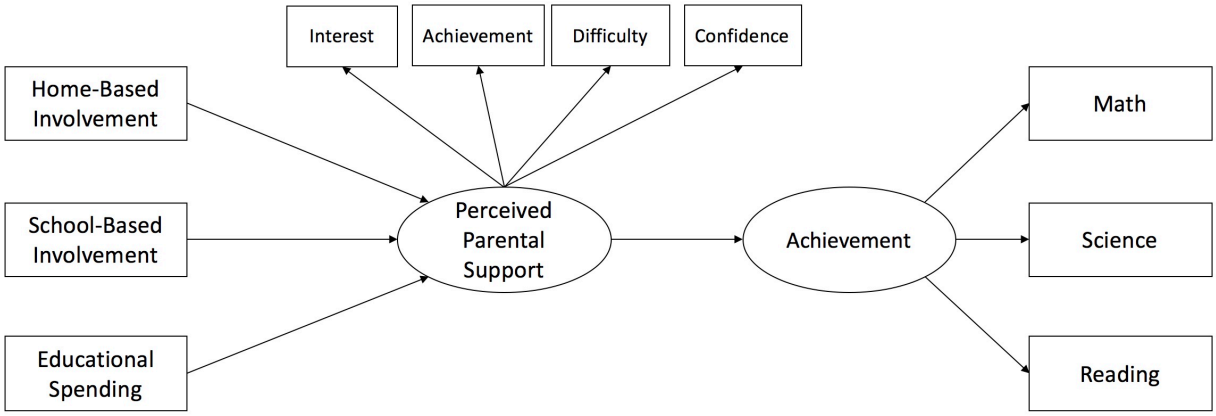


Figure 3.1. The hypothesized theoretical model of the relationships among parental involvement, perceived parental support, and student achievement.

Results

Descriptive Statistics

Tables 3.3, 3.4, and 3.5 provide descriptive information for the samples. Students from Germany report the highest levels of perceived parental support (M = 3.43 to 3.63) compared to students from Belgium, Hong Kong, and Korea. Students from Hong Kong, on average, report the lowest levels of perceived parental support (M = 2.74 to 3.22) based on the four items included in the student survey, followed by Korea (M = 3.29 to 3.42) and Belgium (M = 3.36 to 3.49). These perceived parental support scores parallel those pertaining to parental involvement levels reported by parents, such that in Belgium and Germany, students and parents both report higher levels of support and involvement than their East Asian counterparts.

Table 3.3. *Descriptive statistics: Perceived parental support*

	Belgium		Germany		Hong Kong		Korea	
Item Description	Mean	SD	Mean	SD	Mean	SD	Mean	SD
My parents are interested in my school activities	3.42	.66	3.63	.60	2.74	.70	3.42	.58
My parents support my educational efforts and achievements	3.49	.64	3.52	.68	3.22	.62	3.39	.58
My parents support me when I'm facing difficulties at school	3.42	.69	3.53	.71	3.11	.64	3.31	.63
My parents encourage me to be confident	3.36	.73	3.43	.78	3.14	.65	3.29	.68

Table 3.4. *Descriptive statistics: Parental involvement*

	School-Based		Home-Based		Education Spending	
Country	Mean	SD	Mean	SD	Mean	SD
Belgium	1.32	.22	3.09	.59	4.23	1.32
Germany	1.40	.24	3.32	.57	3.09	1.54
Hong Kong	1.38	.26	3.03	.73	3.16	1.22
Korea	1.40	.29	2.89	.66	3.32	1.36

Table 3.5. *Descriptive statistics: Student achievement*

	Math		Science		Reading	
Country	Mean	SD	Mean	SD	Mean	SD
Belgium	510.56	95.91	505.03	100.05	502.51	99.21
Germany	507.99	88.88	512.27	98.54	512.35	98.68
Hong Kong	550.03	88.93	525.89	80.22	528.72	84.72
Korea	523.78	99.59	515.08	95.15	514.45	98.24

Correlations

Correlations using the entire sample (all four countries combined) are shown in Table 3.6. The four items assessing students' perceived parental support are, in general, positively correlated with all three types of parental involvement. Specifically, the first item assessing the extent to which students feel that their parents are interested in school activities is most strongly positively correlated with parental involvement scales reported by parents. However, even

though all the coefficients are statistically significant at $p < .01$, all the correlations are relatively small or even negligible.

When examining correlations by country (see Table 3.7), it is evident that the positive correlations seen in the combined group analyses may not hold true within some countries. For example, in Belgium, positive correlations are seen between perceived parental support and home-based parental involvement, but not between perceived parental support and school-based involvement or between perceived parental support and educational spending. Correlations between perceived parental support and parental involvement are also weaker for the German sample, but much stronger for Hong Kong and Korean samples.

Table 3.6. *Correlations between perceived parental support and parental involvement (all countries)*

Perceived Parental Support	School Involvement	Home Involvement	Educational Spending
My parents are interested in my school activities	.111	.185	.123
My parents support my educational efforts and achievements	.085	.165	.106
My parents support me when I'm facing difficulties at school	.063	.175	.093
My parents encourage me to be confident	.051	.148	.053

Note. All correlations are significant at $p < .01$.

Table 3.7. *Correlations between perceived parental support and parental involvement (by country)*

Country	Perceived Parental Support	School Involve	Home Involve	Ed Spending
Belgium	My parents are interested in my school activities	.051	.160	.036*
	My parents support my educational efforts and achievements	.005(ns)	.131	.012(ns)
	My parents support me when I'm facing difficulties at school	.016(ns)	.125	.009(ns)
	My parents encourage me to be confident	.014(ns)	.126	-.004(ns)
Germany	My parents are interested in my school activities	.104	.124	.035
	My parents support my educational efforts and achievements	.059	.130	.039*
	My parents support me when I'm facing difficulties at school	.049	.125	.041*
	My parents encourage me to be confident	.007(ns)	.103	.017(ns)

Hong Kong	My parents are interested in my school activities	-.120	.197	.131
	My parents support my educational efforts and achievements	.067	.126	.098
	My parents support me when I'm facing difficulties at school	.054	.157	.084
	My parents encourage me to be confident	.052	.134	.058
Korea	My parents are interested in my school activities	.218	.204	.162
	My parents support my educational efforts and achievements	.196	.200	.197
	My parents support me when I'm facing difficulties at school	.151	.180	.110
	My parents encourage me to be confident	.118	.159	.066

Multiple Group Structural Equation Modeling

In the first step of the analysis, we tested a full mediation model (Model 1, *Figure 3.1*) containing only indirect paths between parental involvement and student outcomes, with students' perceived parental support as a mediator. When examining a combined sample (all four countries together), this theoretical model was well supported by the data, given a root mean square error of approximation (RMSEA) of .047, a Comparative Fit Index (CFI) of .984, and a Tucker-Lewis fit index (TLI) of .979. Although the indices indicate a good fitting model, we wanted to examine if this would still hold true in a multi-group model.

When examining the same theoretical model with the added group comparisons, the model fit indices revealed a poorer fit than for the combined sample. This suggests that a fully mediated model may not be the best fitting model in some of the countries (see Table 3.8)

Upon inspection of the modification indices, constraints were released to allow direct paths between educational spending (the third type of parental involvement) and student academic achievement to account for the significant relationship between the two variables in some of the countries included in our sample. Final model parameter estimates (standardized) and explained variances are shown in *Figure 3.2.*

Table 3.8. *Fit indices for tested models and model comparison tests*

Model	X^2	df	Δdf	ΔX^2	CFI	TLI	RMSEA
Model 1	2110.845	31			.984	.979	.047
Model 2	7208.386	154	123	5097.541**	.917	.910	.101
Model 3	6706.502	150	4	501.884**	.923	.914	.098

**p<.05, **p<.01*

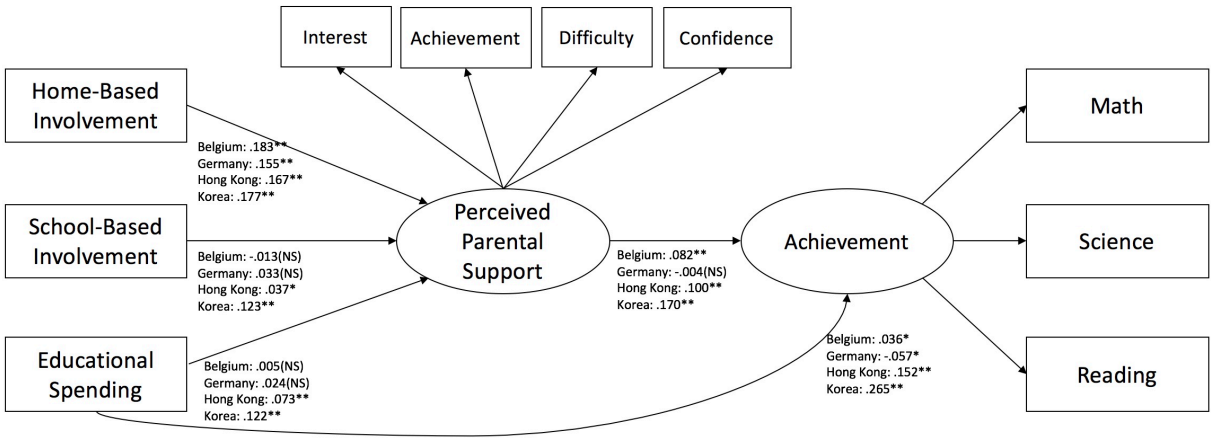
Parental Involvement and Perceived Parental Support. Our final structural equation model indicated that the three types of parental involvement as reported by parents – home-based involvement, school-based involvement, and educational spending – are significant predictors of students' perceived parental educational support in some countries, but not for others (See *Figure 3.2*). In Belgium, only home-based parental involvement is a significant predictor of students' perceived parental support (.18), not school-based parental involvement or educational spending. The same is true in Germany, where home-based parental involvement significantly predicts (.16) the extent to which students feel supported by their parents educationally.

In Hong Kong, all three types of parental involvement are significant predictors of students' perceived parental support, with home-based parental involvement being the strongest predictor at .17, followed by educational spending (.07) and school-based involvement (.04). Likewise, in Korea, all three types of parental involvement significantly predict students' perceived parental support, with home-based parental involvement at .18, school-based parental involvement at .12, and educational spending at .12. Overall, the relationship between parental involvement and students' perceived parental support is the strongest in the Korean sample. The final model explained 3.3% of the variance in students' perceived parental support in Belgium, 3.0% in Germany, 4.2% in Hong Kong, and 8.5% in Korea.

Perceived Parental Support and Achievement. The model parameters suggest that academic achievement is significantly predicted by students' perceived parental support in some of the countries in our sample, but not for others (*See Figure 3.2*). In Belgium, students'

perceived parental support is a weak, but significantly positive predictor of academic achievement in math, science, and reading (.08), and in Hong Kong, it is a slightly stronger predictor at .10, and in Korea, even more so, at .17. In Germany, students' perceived parental support is not a significant predictor of academic achievement. Overall, the model explains only 1% of the total variance in student academic achievement in Belgium, 3.2% in Hong Kong, and 9.6% in Korea. In Germany, the model does not significantly explain any of the variance in student achievement.

Figure 3.2. Final model (model 3) parameter estimates.



Discussion

In the present study, we compared students' perceived parental educational support with parents' reports of parental involvement and examined these in relation to academic achievement outcomes. Previous research has found that parental behaviors as reported by parents may differ from those reported by their children (e.g., Schaefer and Keith, 1985; Tein, Roosa, & Michaels, 1994). Our findings support this lack of correspondence between parent and child reports of

parental support in educational efforts, but further suggests that it might depend on the type of parental involvement examined, as well as the cultural context involved.

First, our results suggest that the extent to which parental involvement reports correspond with students' perceptions about parental educational depends on the type of parental involvement examined. Specifically, home-based involvement behaviors, such as discussing academic progress with child at home, helping with homework, and engaging in various educational activities at home, are positive predictors of students' perceived parental support. In other words, when students receive educational support at home, they tend to internalize those efforts such that they feel supported by their parents in their learning. Although the correlations were not very high, this was a universally valid pattern found in all four country samples. This reaffirms the important role of home-based involvement continually emphasized in literature as being instrumental in reinforcing the knowledge and instruction received at school (Comer, 1995) and providing much needed assistance and clarification with homework (Cooper, 1989).

On the other hand, school-based parental involvement, such as parents discussing academic progress with the teacher on their own initiative, volunteering in schools, and attending parent-teacher meetings, was not found to be a universally significant predictor of students' perceptions about parental support. This may be due to the nature of the sample used in this study, both in terms of student age and cultural background. PISA samples 15 year olds typically enrolled in secondary or middle schools from around the world, and past research on parental involvement has argued that in middle schools, at least in the American schooling context, school-based involvement is less effective in helping students academically (e.g., Hill & Tyson, 2009). This is because in middle schools, school-based involvement primarily involves attendance in school activities, rather than opportunities to interact directly with the teacher to

address their children's academic needs. And research shows that this type of school-based involvement behaviors is less beneficial for students as it does not provide parents with any information about the classroom content or learning pedagogy, or the opportunity to build a meaningful relationship between teachers and parents (Seginer, 2006).

The lack of correspondence between school-based parental involvement and students' perceived parental support may also be due to the fact that in some cultures, school-based involvement is simply seen as less important and even less encouraged. And when cultural norms surrounding parental roles in schools are different, it only makes sense that we would see culturally varied relationships between school-based involvement and students' perceptions of parental educational support.

In general, our findings suggest that there is a higher level of correspondence between parental involvement behaviors as reported by parents and students' perceived parental support in the two East Asian locations examined in our study (Hong Kong and Korea) compared to their European counterparts. This suggests that students from Hong Kong and Korea are more likely to feel supported by their parents educationally if the parents themselves report higher levels of parental involvement behaviors. But perhaps the most striking cross-national difference is in one particular type of parental involvement – parental educational spending – and how this predicts the extent to which students feel supported by their parents educationally. In both Hong Kong and Korea, parents' educational spending is a significant, positive predictor of perceived parental support, such that when parents spend more money on tuition related expenses, private tutoring, and cram schools, students are more likely to feel supported educationally.

This may be because in these East Asian countries, parents being involved in this way means that they typically gather information extensively to find a private tutoring service that

would best fit the needs of their children (Park, Byun, & Kim, 2011). In fact, Park, Byun, and Kim (2011) suggest that many mothers with children of school age are often involved in networks, both online and/or in person, where they share new information on private tutoring in regular meetings during the daytime when their children are at school. And their involvement is not just limited to gathering information to choose a private tutoring or cram school service but extends to constant monitoring of children's progress within these learning facilities. Parents that are involved in this way are continuously checking report cards sent from private tutoring services and consulting with instructors to check on their children's academic improvement (Lee, 2008). Perhaps this is done more frequently and with more diligence because parents want to ensure that their financial investments are being utilized to the greatest extent possible.

But nonetheless, these involvement behaviors are somewhat analogous to those of American parents that visit classrooms and contact school teachers to discuss their children's achievement and monitor progress. And since past research has shown that such hands-on involvement behaviors, in general, are positively related to student outcomes (e.g., Comer, 1995; Epstein, 2001; Hill & Taylor, 2004), it makes sense to see the positive link between (parental involvement in) educational spending and students' perceived parental support among the two East Asian samples included in our study.

Another major finding of our study is that students' perceptions about parental educational support is a positive predictor of achievement, but this relation only holds true in our Hong Kong and Korean samples. In both Belgium and Germany, this relationship was either not significant or negligible, suggesting that in these countries, perceived parental support is not a significant mediator in the relationship between parental involvement and student academic achievement. Past research has not directly examined this relationship, particularly from an

international perspective, but we can speculate that this is due to the culturally unique nature of parent-child relationships in these countries. Past research has demonstrated that the ways in which parent-child interactions influence students both psychologically and academically vary cross-culturally. For instance, Crystal and colleagues (1994) found, in their cross-cultural study of Japanese, Chinese, and American high school students, that although Asian students tend to report higher levels of parental expectation and lower levels of parental satisfaction concerning academic achievement than their American peers, they tend to report less stress and academic anxiety. Among Western students, the opposite pattern was true, such that higher levels of parental expectation and lower levels of parental satisfaction would have negative consequences. Although this study does not directly address perceived parental support and how it relates to achievement, these findings show that parent-child interactions/relationships, particularly concerning academics, may simply play out differently in East Asian cultures due to factors unique to their culture.

Finally, and perhaps most importantly, this study underscores the importance of examining parental involvement from a cross-cultural perspective by demonstrating that a seemingly straightforward relationship may not hold true in other countries with different educational system and traditions. Specifically, our structural equation modeling results showed that although the fully mediated model initially designed was a well-fitting model, group comparisons (cross-national) revealed substantial differences between cultures. This shows that important details can be lost or overlooked when examining important educational topics without taking any potential cultural differences into account. For instance, we would not have able to see clear East/West differences in the relationships among educational spending (as a form of

parental involvement), perceived parental support, and learning outcomes, had we not made cross-cultural comparisons a focus of this research.

But our cultural findings cannot offer any advice on the best ways for parents to be involved. Instead, our results simply show that there is no one best way for parents to be involved in their children's education because the cultural context in which it occurs dictates what is effective or not effective in that particular setting. This is because school systems provide different opportunities for parental involvement and they also vary in what they expect of students. Countries also vary in opportunities for education outside of schools, which has important consequences on how parents can be involved in their children's learning outside of schools, and how these efforts are perceived by their children. By investigating the big picture, and acknowledging the multiple contextual factors involved, we can extend our understanding of the complicated processes through which parents are involved in their children's education and their consequences for student outcomes.

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CHAPTER 4

Teaching Quality and Student Learning Experiences: A Continuous Data Collection Method for Capturing Student Experience of Teaching

Abstract

Recent studies have questioned the validity of standard course evaluations used in colleges to assess teaching effectiveness. To remedy the drawbacks of this evaluative method and obtain useful evaluative information about teaching quality, we used a continuous data collection technique to examine how students experience the teaching they receive. We experimentally investigated how first impression and instruction quality related to learning and evaluation of instruction among college students. We focused on how students process initial perceptions and/or judgments of teachers as well as learn from the teaching quality they receive, and how these things together influence their evaluations of instruction and level of learning. Results from two studies indicate that overall quality of instruction, as well as the specific teaching strategies and behaviors included in a lesson have significant consequences on both student learning and evaluation of the instruction. On the other hand, first impressions that teachers make in the first few minutes of a class do not matter as much as past research suggests. Potential implications of using this evaluative method and avenues for future research are discussed.

Introduction

First Impression in Teaching

Hiebert and Morris (2012) argue that educators and policymakers in the U.S. generally focus on improving the quality of *teachers* rather than aiming to improve the quality of *teaching*. Such an emphasis on inherent personal traits of a teacher might stem, in part, from psychological literature showing the importance of enduring personality traits. One such study conducted by Ambady and Rosenthal (1993) prompted a whole series of studies on the lasting effects of first impressions. In this study, the researchers found that students who watched 30-second silent video clips from the first day of college classes gave instructor ratings that did a surprisingly good job of predicting end-of-term course evaluations from different students who spent the semester in a course. This suggests that final judgments about teaching quality are often made swiftly (in as little as 30 seconds!).

Striking as these results are, however, they leave open two quite different interpretations. The first is that first impressions color our later experience, such that a teacher who makes a bad impression on the first day of class has irrevocably tarnished his or her students' opinion about the teaching that follows. This interpretation is reflected in the folk saying that "you never have a second chance to make a first impression." In line with this view, theory and research have suggested that people suffer from a phenomenon known as confirmatory bias—a tendency for initial impressions to affect later judgments even after exposure to contradictory evidence. This occurs because the expectations we build from our initial impressions influence our interpretation of later events, leading us to favor, remember, or selectively gather information that confirms rather than refutes our beliefs (Rosenzweig, 2007; Rabin & Shrag, 1999).

Alternatively, however, it may be that the reason that first impressions are predictive of actual end-of-term evaluations is that they really are indicative of the quality of a course. The impression that a teacher makes on the first day of class may genuinely be predictive of the impression that she makes throughout the term. In fact, prior research has shown that nonverbal, relatively automatic behaviors that are linked to first impression formation are quite stable across different interactive contexts (Weisbuch et al., 2010). This suggests that the impressions students have of instructors based on their nonverbal behaviors may be relatively consistent between the first minute of a lesson and the remainder of the class or term.

To evaluate these different interpretations, my colleagues and I (Samudra, Min, Cortina, & Miller, 2016) developed an experimental method that allows us to examine the role that initial perceptions/judgments of teachers and actual teaching quality play in both student evaluations of instruction and student learning. We created experimental lectures that allowed us to control the impression the instructor made and the quality of the lecture that followed. Results from our analyses (Samudra, Min, Cortina, & Miller, 2016) indicate that quality of teaching, not teachers' personal traits as judged by students, is the stronger determinant of student factual and conceptual learning. First impressions matter to some extent in student evaluations, but teaching quality was a stronger influence on both evaluations and student learning.

These results are encouraging, particularly from a pedagogical point of view, as it underscores the importance of teaching relative to instructors' personal traits. But one problem with this method (and with course evaluations in general) is our limited ability to connect specific things instructors do with student experience of the lesson. It also limits us to only the input side of the equation (i.e. quality of teaching) and does not allow us to understand the specific processes that lead to the output (i.e. student learning). To address these shortcomings,

this current study focuses on the processes by which students learn from instructors with differing initial impressions and teaching quality.

Course Evaluation and Student Learning

Examining the processes by which students learn from teachers is far more valuable than looking at course/teaching evaluations to decipher the quality of teaching. Although routinely administered to gauge and evaluate one's teaching ability, standard course evaluations (e.g. course evaluations are highly limited, and even if written student feedback is provided, comments from one student often contradicts another, rendering it useless as a guide to how to improve teaching.

Such serious drawbacks of course evaluations warrant the need to look for alternative methods of evaluating teaching that could potentially even inform student learning. And if there is a way to obtain student responses as the teaching unfolds, rather than providing a retrospective evaluation, it would be even more useful. This study seeks to accomplish this by obtaining student responses about instruction in real time as a lesson unfolds. This real-time information will be valuable as it can be a novel way to look at quality of a lesson, and increase understanding of how students experience it. This would also allow us to see whether and how these real-time ratings relate to overall evaluation ratings taken post-instruction.

Learning from Teaching

What are some of the thought processes that occur in students during a typical university lecture? For instance, how much of the thinking that occurs in a classroom relates to understanding and synthesizing the learning content versus simple mind wandering and other irrelevant thoughts? This is a question that Bloom (1953) tried to answer in a study that used a type of memory retrieval method to determine student thoughts that occurred during a class

lecture. This method, also known as *stimulated recall*, uses some type of cue or stimulus to help subjects recall the original situation, including auditory cues of parts of the class. Bloom (1953) found that in both lectures and discussions, irrelevant or tangential thoughts unrelated to the lesson, including thoughts about the self and other persons (including the teacher and classmates), make up about half of all thought processes recalled.

Other studies have also used stimulated recall as a method for examining thoughts and decision-making that occurs in classrooms (e.g. Housner & Griffey, 1985; Krause, 1986; Parker & Gehrke, 1986; Martinek &Griffith, 1994; Anthony, 1994; Chittenden, 2002). However, several major limitations exist with this approach, such as participants supplementing incomplete memories (Lee et al., 1992), reacting to what is viewed or heard on the tape, rather than recalling the taped episode (Tjeerdsma, 1997), and conscious censoring of the recall by the subjects (Calderhead, 1981).

Despite these limitations, this method provides valuable information about how students experience the teaching they receive and the thought processes that might occur during this experience. But if there was a way to obtain this information at time intervals closer to when the thought processes are actually occurring, we would be better able to understand the effectiveness of various teaching methods and techniques. This is what our current study seeks to accomplish.

The Current Study

In two studies, we investigate the processes by which students experience the teaching they receive. We focus on how students process initial perceptions and/or judgments of teachers as well as learn from the teaching quality they receive, and how these factors together influence their evaluations of instruction and level of learning. To examine the specific learning processes,

we used a method that allows us to get continuous feedback from students on their experience of a lesson.

This new data collection technique allows us to obtain real-time responses related to students' level of learning during a lesson as students first meet the instructor and listen to her lecture on an unfamiliar topic. And since this is a technique that requires students to engage in complex cognitive processes – to learn something from the lesson while also metacognitively evaluating their own level of learning – we decided to use college students as participants of this study.

Study 1

Method

Participants

Participants were 197 undergraduate students (103 males, 94 females) enrolled in an introductory psychology course at a large Midwestern University in the United States. Participants received course credit for taking part in the study. The majority of participants were in their first or second year of university (88.8%), and ranged in age from 17 to 22 years (M = 18.85, SD = 1.40). 88% reported being native English speakers.

Materials

First Impression Videos. A young East Asian female actor portrayed the instructor for all first impression and instructional videos used in Study 1. In the first impression video, the actor introduced herself and described her interest in the subject matter. A similar verbal script was used for the good and bad first impression videos, so the quality of the first impression was manipulated through tone of voice and body language.

For the good first impression, the actor portrayed confidence, enthusiasm for the subject matter, and an interest in teaching the subject matter to the viewers. This was accomplished by using a strong and positive tone of voice as well as enthusiastic and relevant gestures and facial expressions.

To make a bad first impression, the actor displayed lack of interest in both the subject matter and in teaching. This was demonstrated by a relatively monotonous and negative tone of voice, a disinterested facial expression, and frequent fidgeting, including taking a drink from a water bottle mid-sentences, looking at a cellphone and even rolling eyes at one point in the introduction.

Instructional Videos. The demands of scripting limited us to lecture as a mode of instruction without interaction among students, in a single class session. We attempted to create realistic lectures that a college undergraduate might experience, and manipulated variables found to be important in the Ambady & Rosenthal (1993) study in order to produce a good and bad first impression.

The topic of instruction was international comparisons in education. Identical slides were used in the good and bad instruction presentation slides and both videos showed the actor giving a lecture on the topic. The edited video that participants viewed showed a full screen PowerPoint slide, with a small window on the side of the screen where the instructor was visible.

The good instruction video was well-organized and included complete explanations and elaborations. The bad instruction video maintained the same order of slides, but the instructor was made to appear less organized by needing time to remember what he needed to say for some slides, and using scripted filler words such as “um.” Additionally, within each slide, information was covered in less detail and was sometimes presented in a different, less coherent order than in

the good instruction video. All information that was later tested on the quiz was fully covered in both instruction videos.

Design and Procedure

The study employed a 2 (First Impression: Good/Bad) x 2 (Instruction: Good/Bad) experimental design (First Impression x Instruction). Participants were randomly assigned to one of the four conditions. Using an experimental design allowed us to see the effects of varied teaching quality in a transparent, controlled, and replicable manner.

The experiment took approximately 45 minutes, and participants were tested independently. Up to three subjects participated simultaneously in a single experimental room, each seated in front of his/her own computer and joystick, listening to the video through headphones and rating the video using the joystick provided. Participants did not interact during the experiment and could not see each other's computer screens or the joysticks being used.

After collecting signed consent forms from participants, an experimenter provided a brief description of the research protocol and made sure the participants understood the procedures involved. Then participants were asked to put on their headphones to view the video. The first impression and instructional video were combined into a single file to make it clear that the first impression was an introduction to the instruction that followed. During the entire video (20~24 minutes long, depending on condition), the participants were asked to rate the video on the following two evaluative criteria: 1) level of learning/understanding and 2) evaluation of the instructor/instruction. The participants were asked to provide ratings continuously throughout the entire video, while keeping their dominant hand on the joystick the entire time. No button pressing was required to record the data – the participants simply had to move (or keep) the joystick to the appropriate point in the rating scale provided on the screen.

After participants performed the video viewing/joystick rating, the experimenter opened an online quiz that included demographic variables, a measure of student learning, and a teacher evaluation questionnaire, and asked the participant to complete it. This allowed us to see how the perceived process of learning (via level of learning recorded) mapped onto the amount of learning that actually occurred. After completing the online quiz, participants were debriefed on the purpose and goals of the research.

Capturing Real-Time Student Ratings

To capture continuous ratings of instruction, we used a software system called DARMA (Dual Axis Rating and Media Annotation) (Girard & Wright, 2017) that runs on most Microsoft operating systems. The joystick used in our lab is the Microsoft Sidewinder Force Feedback. This assessment technique involves watching a video on a computer screen and rating the target person's behavior and/or one's own affective state using the computer joystick. While watching the video, the participant can monitor where the current joystick rating lies in the two-dimensional plane.

Figure 4.1 shows the configuration used in this study, with the vertical dimension representing level of engagement/learning (ranging from learning a lot to learning very little), and the horizontal dimensions representing evaluation of the instruction/instructor (ranging from poor instruction to excellent instruction). Moving the joystick forward or backward represents changes in level of learning/engagement and moving the joystick to the right or left represents changes in how the participant feels about the instruction. Additional feedback to help orient the rater comes from the "force feedback" feature of the joystick. When the joystick is moved further way from the origin, it pushes more against the rater's hand, providing tactile feedback about the

joystick position. During the coding, the joystick monitoring program records the joystick (X,Y) position twice every second and exports the data into a single excel file.

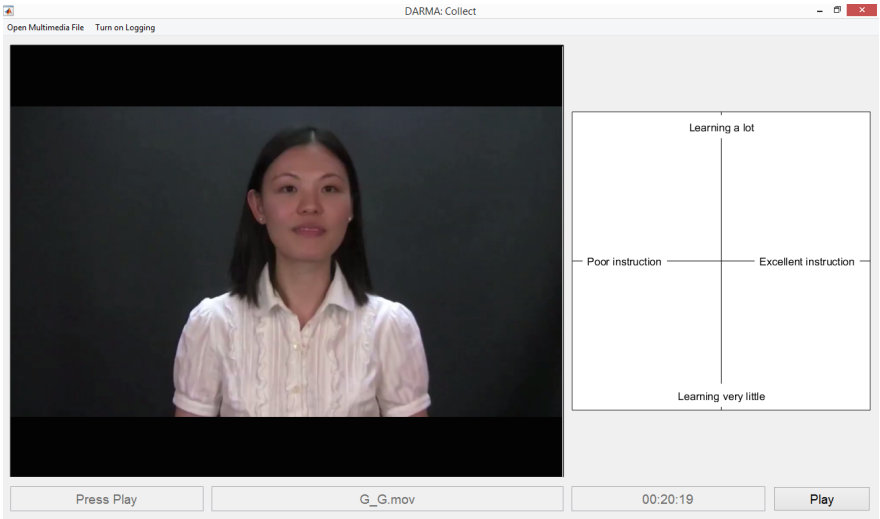

Figure 4.1. The DARMA software data collection screen. A red dot indicating the location of the joystick would appear on the grid once the video starts.

Measures

Demographic Variables. To assess comparability across conditions, participants answered questions about their age, gender, year in school, and English as a first language status.

Student Learning. Learning was assessed through a quiz with eighteen multiple-choice questions. Questions assessed important concepts and definitions covered in the instructional video. Twelve of the questions were designed to be lower-level definitional questions that were exclusively based on recalling the information in the video. Six additional questions were more conceptual in nature, and required applying the information in the video in a manner that was not directly discussed in the video or extending it to a new context. An example of a factual and conceptual question used in this quiz can be found in Appendix B. The sum of correct responses to quiz questions (0-18) was used as an indicator of student learning.

Teacher Evaluation. The final portion of the online questionnaire asked participants to rate the instructor in the video on a scale of 1-10 on the following fourteen dimensions (following Ambady & Rosenthal, 1993): accepting, active, anxious, attentive, competent, confident, dominant, empathetic, honest, likeable, optimistic, professional, supportive, and warm. Students also provided overall ratings of the instructor on a scale of 1-5 in terms of how excellent the teacher was, how clear and understandable the instructor was, how well prepared the instructor seemed, and how interesting the lesson was.

Results

Analysis

Descriptive statistics for student learning outcomes, teacher evaluations, and joystick ratings can be found in Tables 4.1 and 4.2. No significant differences were found between the four experimental groups regarding age, year in school, gender, and English as a first language status. Consequently, these variables were not included in further analyses. For those analyses, dependent measures were first analyzed using a 2 (first impression: good or bad) × 2 (instructional quality: good or bad) multivariate analysis of variance (MANOVA), with both factors between subjects. This allowed us to examine the main effect of both first impression and instructional quality on student learning and instructor evaluation.

Then, graphs of the joystick ratings were examined, each aggregated by condition to identify the mean fluctuations in participant ratings of both level of learning and evaluation of the instruction. We identified several key time points pertaining to any noticeable dips and rises in the continuous ratings and examined which parts of the lesson triggered these changes in both the ratings about the instructor and level of learning.

Student Learning

As shown in Table 4.4, There was a significant main effect of instructional quality on quiz scores, $F(1, 194) = 15.07$, $p < .001$, where the good instruction condition ($M = 10.21$, $SD = 2.53$) produced higher quiz scores than the bad instruction condition ($M = 8.82$, $SD = 2.75$). There was no main effect of first impression condition on student learning, and no interaction between instructional quality condition and first impression condition (Fs < 1). Descriptive statistics for both instructional quality and teacher evaluations can be found in Table 4.1 and joystick mean ratings are shown in Table 4.2.

Table 4.1. *Study 1 Descriptive statistics: mean scores for each condition*

Dependent Variable		Condition							
		GG		BG		GB		BB	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Student Learning	Total Quiz Score	10.12	2.57	10.30	2.65	8.96	2.64	8.67	2.50
Perceived Teacher Personality Traits	Accepting	6.22	2.28	6.02	2.51	3.67	2.26	3.58	2.29
	Active	3.16	2.08	3.84	1.97	2.26	1.61	2.38	1.68
	Anxious	3.33	2.46	5.46	2.62	3.98	2.65	5.48	2.91
	Attentive	4.78	2.62	5.10	2.33	2.13	1.41	2.44	1.56
	Competent	5.42	2.72	5.66	2.79	2.57	1.76	2.44	1.66
	Confident	4.75	2.57	4.20	2.14	2.54	1.81	2.17	1.33
	Dominant	2.63	1.78	3.08	1.96	2.02	1.42	1.77	1.08
	Empathetic	4.12	2.49	4.26	2.07	2.72	1.86	2.69	1.67
	Honest	6.73	2.29	6.96	2.08	5.50	2.99	4.77	2.39
	Likeable	4.84	2.28	5.02	2.43	2.46	1.85	2.46	1.92
	Optimistic	5.14	2.32	5.34	2.43	2.70	2.23	2.71	1.93
	Professional	7.65	2.36	5.68	2.75	2.07	1.64	2.04	1.89
	Supportive	4.90	2.56	5.06	2.34	2.30	1.85	2.38	1.85
	Warm	4.65	2.62	4.16	2.44	2.43	1.94	2.38	1.84
Overall Teacher Ratings	Excellent Teacher	2.33	1.05	2.40	1.03	1.28	.62	1.23	.63
	Clear & Understandable	3.14	1.06	3.46	1.13	1.54	.81	1.58	.90
	Well-Prepared	3.53	1.21	3.28	1.18	1.41	.83	1.25	.60
	Interesting	2.57	1.17	2.86	1.23	2.28	1.19	1.96	.97

Table 4.2. *Study 1 Descriptive statistics: joystick mean ratings for each condition*

Dependent Variable	Condition											
	GG			BG			GB			BB		
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
Total Quiz Score	10.12	51	2.57	10.30	50	2.65	8.96	46	2.64	8.67	48	2.50
Evaluation of Instruction	-18.93	43	32.51	-9.81	43	40.04	-63.32	38	26.16	-66.18	39	26.25
Engagement/Learning	12.95	43	20.44	13.86	43	33.94	-27.32	38	30.37	-36.85	39	32.05

Teacher Evaluations

Table 4.3 shows correlations between real-time joystick ratings (average scores across the lesson) and post-test teacher evaluation ratings. As expected, the two evaluative scales are highly significantly ($p<.001$) correlated, ranging from $r = .71$ to .85. This suggests that the way students perceive instruction and evaluate it in real time has predictive consequences on the way they evaluate the teacher and the teaching quality after the culmination of a lesson.

Table 4.3. Study 1 *Correlations between DARMA joystick ratings & post-test teacher evaluation ratings*

Variables	1	2	3	4
1. Joystick Engagement/Learning	-			
2. Joystick Instructional Quality	.81	-		
3. Posttest Teacher Personality traits	.71	.77	-	
4. Posttest Overall Teaching Evaluation	.76	.83	.85	-

Note. All correlations are significant at $p < .01$.

Instructional quality influences. There was a significant main effect of instructional quality on participant ratings for thirteen out of the fourteen specific instructor trait dimensions (see Table 4.4). Compared to the bad instruction condition, participants rated the instructor in the good instruction condition as significantly more *accepting*, $F(1, 194) = 57.17$, $p < .001$, *active* $F(1, 194) = 19.79$, $p < .001$, *attentive*, $F(1,194) = 80.47$, $p < .001$, *competent*, $F(1,194) = 83.36$, $p < .001$, *confident*, $F(1,194) = 53.00$, $p < .001$, *dominant*, $F(1,194) = 17.24$, $p < .001$,

empathetic, F(1, 194) = 25.35, $p < .001$, *honest*, F(1,194) = 23,64, $p < .001$, *likeable*, F(1,194) = 64.64, $p < .001$, *optimistic*, F(1,194) = 61.51, $p < .001$, *professional*, F(1,194) = 144.67, $p < .001$, *supportive*, F(1,194) = 70.79, $p < .001$, and *warm*, F(1, 194) = 38.43, $p < .001$.

Instructional quality also resulted in significant differences on the three global instructor ratings, where the instructor in the good instruction condition was rated significantly higher than the bad instruction condition on being an *excellent teacher*, F(1,194) = 79.76, $p < .001$, being *clear and understandable*, F(1,194) = 149.97, $p < .001$, being *well prepared*, F(1,194) = 216.27, $p < .001$, and *interesting*, F(1,194) = 13.32, $p < .001$.

First impression Influences. The good first impression condition produced significantly lower ratings than the bad first impression condition on one of the fourteen specific instructor traits: *anxious*, F(1,194) = 22.62, $p < .001$. That is, students in the good first impression condition rated the teacher as being less anxious than students in the bad first impression condition. The difference between instructor ratings in the good and bad first impression conditions was approaching significance for one additional overall instructor rating: *well-prepared,* F(1, 194) = 3.23*,* $p < .07$*)*. First impression condition did not produce any differences in the other two overall instructor ratings or the rating on how *interesting* the lecture was. And there were no significant interaction effects between first impression and instructional quality.

Table 4.4. *Study 1 Main effects of first impression and instructional quality on student quiz score and teaching evaluation.*

Dependent Variable		Independent Variables							
		First Impression				Instructional Quality			
		F	*df*	Partial η^2	Sig.	*F*	*df*	Partial η^2	Sig.
Student Learning	Total Quiz score	.06	1/194	.00	.82	15.07	1/194	.07	.00
	Accepting	.09	1/194	.00	.76	57.17	1/194	.23	.00
	Active	2.53	1/194	.01	.11	19.79	1/194	.09	.00
	Anxious	22.62	1/194	.11	.00	.74	1/194	.00	.39
	Attentive	.86	1/194	.00	.36	80.47	1/194	.30	.00
	Competent	.03	1/194	.00	.87	83.36	1/194	.31	.00

Perceived Teacher Personality Traits	Confident	3.05	1/194	.02	.08	53.00	1/194	.22	.00
	Dominant	.05	1/194	.00	.82	17.24	1/194	.08	.00
	Empathetic	.03	1/194	.00	.87	25.35	1/194	.12	.00
	Honest	.42	1/194	.00	.52	23.64	1/194	.11	.00
	Likeable	.11	1/194	.00	.74	64.64	1/194	.25	.00
	Optimistic	.11	1/194	.00	.75	61.51	1/194	.25	.00
	Professional	1.42	1/194	.01	.24	144.67	1/194	.43	.00
	Supportive	.10	1/194	.00	.75	70.79	1/194	.27	.00
	Warm	.64	1/194	.00	.42	38.43	1/194	.17	.00
Overall Teacher Ratings	Excellent Teacher	.01	1/194	.00	.94	79.76	1/194	.30	.00
	Clear & Understandable	1.48	1/194	.01	.23	149.97	1/194	.44	.00
	Well-Prepared	3.23	1/194	.02	.07	216.27	1/194	.53	.00
	Interesting	.00	1/194	.00	.95	13.32	1/194	.07	.00

Joystick Ratings (Real-Time Evaluation of Teaching & Learning)

The joystick data obtained from the DARMA software were aggregated by condition to produce graphs as shown in *Figures 4.2* to *4.5*. These graphs illustrate the mean changes in joystick ratings on two separate evaluative dimensions: evaluation of the instruction/instructor and level of learning. In the BB condition (bad first impression/bad instruction) shown in *Figure 4.2*, the initial dip in both rating dimensions are clearly evident around T = 150 (1 minute 15 seconds). This occurs shortly after the instructor exhibits several distracting behaviors intentionally weaved into the introduction video to make a bad first impression. This included acts such as drinking water in the middle of a sentence, rolling her eyes, taking many small pauses in between sentences, and using many filler words, particularly “um”.

Another noticeable dip in ratings in the BB condition occurs around T = 960, or approximately 8 minutes into the video. Although there has been a steady gradual decline in participants’ real-time ratings in both rating dimensions up until this point, this is a noticeable sharp decline that occurs shortly after the presentation of a slide containing a large graph to show achievement comparisons across countries in PISA. On this slide, the graph is slightly blurry and the font size used in the labels are very small. The instructor also pauses a lot during her

explanation, using phrases indicative of uncertainty such as “I think?” and ending sentences in a question form while trying to explain the bar graphs shown on the slide.

Despite the consistent poor ratings throughout the BB condition video, a small upward shift occurs in both rating dimensions at around T = 1195, or 9 minutes 57 seconds. This rise occurs shortly after the instructor presents a slide where she first introduces the attitude achievement paradox in international comparisons. She presents the topic with a question designed to garner student interest about the topic, followed by an example of a question item typically used to measure it.

In the GG condition (good first impression/good instruction) shown in *Figure 4.5,* the first noticeable rise in ratings occurs at around T = 403, or 3 minutes 21 seconds. This occurs shortly after the instructor spends an entire slide on why the topic at hand is important and useful. The second noticeable rise occurs at T = 885, or 7 minutes 22 seconds, shortly after the slide explaining the attitude achievement paradox. This is an interesting observation since a similar positive shift occurred during the same slide even in the bad instruction condition, further corroborating the fact that the contents of this slide and the way it is presented elicits a positive student response. Another noticeable rise in both rating dimensions occurs at around T = 1510, or 12 minutes 34 seconds, shortly after the instructor switches the topic to start discussing the case study of Germany. Around this time, the instructor introduces the three different types of schools for secondary education in Germany.

In the GG condition video, the first noticeable drop in student ratings occurs at around T = 660, or 5 minutes 30 seconds. This occurs shortly after the slide with large bar graphs (with labels in very small font) that triggered a negative downward shift in ratings in the BB condition as well. Even though the instructor proceeds to explain the graph more thoroughly and in an

understandable manner in this good instruction condition, the drop in ratings still takes place shortly after the presentation of this slide. Another noticeable dip in ratings occurs at around T = 1231, or 10 minutes 15 seconds, shortly after the instructor presents a rather text-heavy slide that she proceeds to read much of the text from.

Overall, the joystick ratings were able to effectively capture student experience of the different aspects of teaching, including their own level of learning. And participants in both good instruction conditions (regardless of first impression) rated their own level of learning higher than participants in bad instruction conditions. This suggests that students' own assessment of learning (captured by the continuous ratings), for the most part, maps onto their actual learning outcomes as shown by the higher average quiz scores. But it is important to note that there is a small cost of doing the continuous ratings, as it appears to drop the overall average quiz scores for all conditions by just over a point (out of 18) when compared to results from an earlier version of this study by Samudra and colleagues (2016) that used the same lesson and quiz questions. We speculate that this is due to the metacognitive efforts demanded by this type of self-evaluative task.

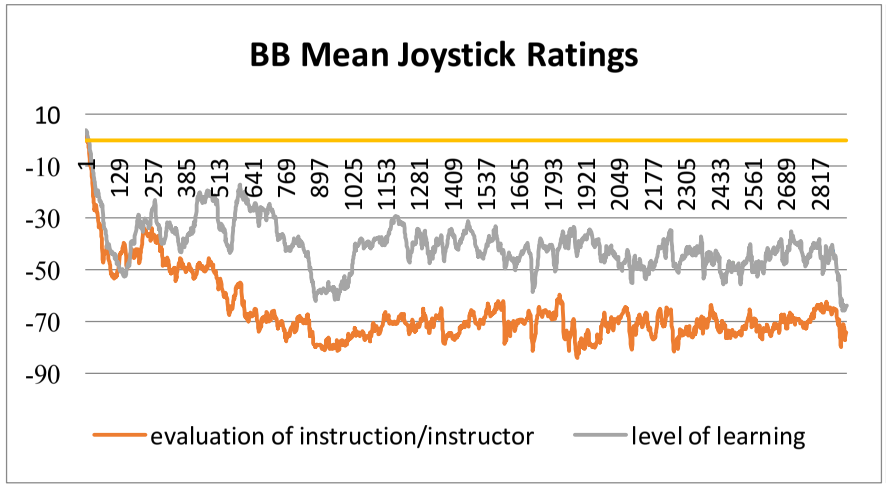

Figure 4.2. BB (bad first impression/bad instruction) condition: Aggregated mean joystick ratings across the lesson (plotted every half a second).

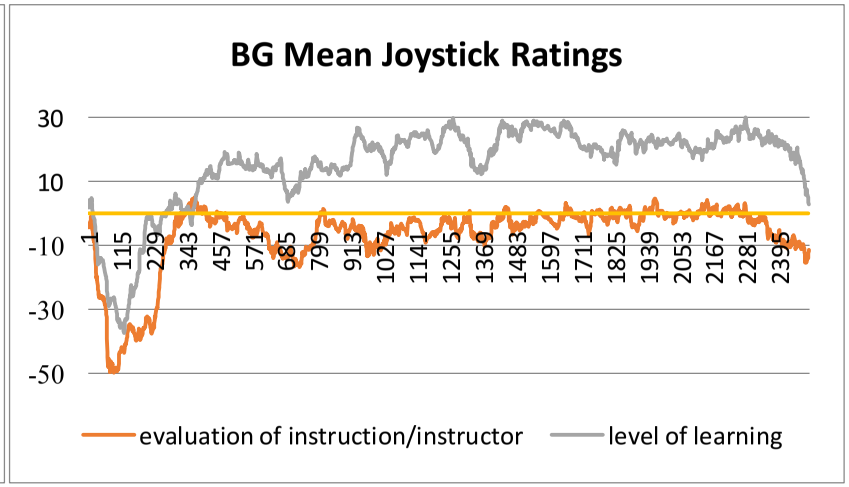

Figure 4.3. BG (bad first impression/good instruction) condition: Aggregated mean joystick ratings across the lesson (plotted every half a second).

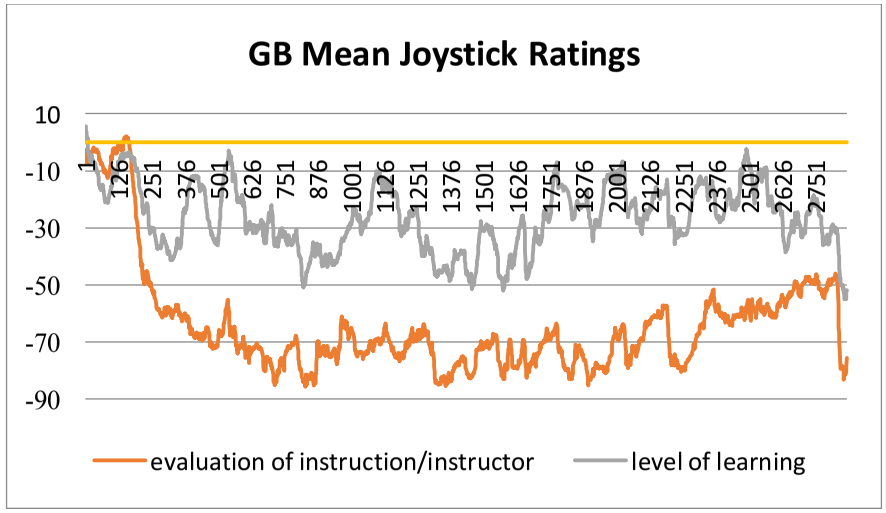

Figure 4.4. GB (good first impression/bad instruction) condition: Aggregated mean joystick ratings across the lesson (plotted every half a second).

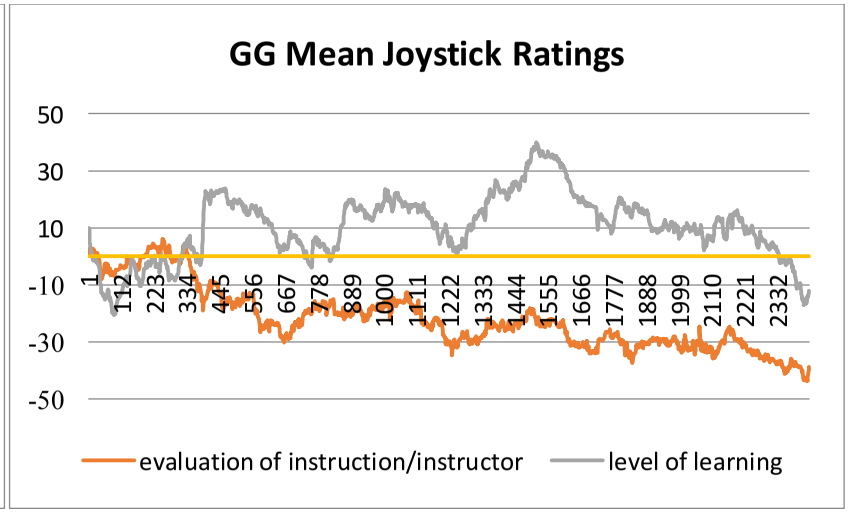

Figure 4.5. GG (good first impression/good instruction) condition: Aggregated mean joystick ratings across the lesson (plotted every half a second)

Discussion

The purpose of Study 1 was to examine how teachers' first impression and instructional quality influences student learning processes and evaluation of instruction. This study was designed to both replicate the findings of Samudra, Min, Cortina, and Miller (2016) and delve deeper into the learning and evaluative processes involved. To do this, we used a new data collection technique that allowed us to obtain real-time responses related to students' level of learning and feelings about the instruction. In doing so, we were able to examine how students experience and learn from the teaching they receive.

In line with the findings of Samudra and colleagues (2016), we found that instructional quality, not first impression, has a significant effect on student learning and evaluation of the teaching. Instructional quality affected not only how much students remembered and learned from the lesson, but also how they evaluated the instructor and the overall instruction afterwards. But unlike findings of existing literature on the lasting effects of first impression on student evaluation of teachers (e.g., Ambady & Rosenthal, 1993), we only found one significant main effect of first impression on teacher evaluation – for the trait of *anxious*. This could be a result of the way we manipulated our first impression conditions. The frequent fidgeting and the lack of confidence portrayed in our first impression videos might have been perceived as anxiousness. But since this was the only significant main effect found out of a total of 18 teacher evaluation dimensions, we are unable to say that this is a robust finding that shows the lasting effects of first impression.

When looking at how students experienced and learned from the lesson in real-time, we found that the factors that we manipulated to vary the quality of instruction really did have an influence on how students rate the instruction and learn from it. For example, in the good

instruction condition, we made sure to provide full explanations and concrete examples for a newly introduced concept as suggested by McKeachie and Svinicki (2006). We found that this enhanced not only the level of learning but also how the students rated the instruction during the lesson (via joystick ratings). And even in the bad instruction condition where we did not provide the full explanations, but presented the same well-organized PowerPoint slide with examples, student engagement was enhanced and positive feelings about the instruction was reported. On the other hand, when a power point slide lacked conciseness, and was packed with either too much text or complicated graphs with labels in small font sizes, students reported more negative feelings about the instruction and learned less from it. This underscores the importance of brevity and organization when it comes to instruction, and particularly when lecturing with powerpoint slides.

In line with research on teaching quality (e.g., Atkins & Brown, 1988; McKeachie & Svinicki, 2006), we found that shifting focus helps to sustain student attention and thus lead to better learning. When we introduced the case study of Germany to shift the focus away from an information-heavy topic and provide a much needed cognitive break, the real-time ratings on both evaluative scales increased noticeably. This reaffirms what most teachers already know but often forget to take into account – that student attention is limited and we need to find ways to redirect their focus using various different methods.

Study 2 extended this paradigm to look at a different lesson topic in hopes of replicating and delving deeper into how students process and experience the teaching they receive. The new topic was more relevant to psychology, making it more applicable to the participants' learning context. We also varied the instructor to increase generalizability of our findings.

Study 2

The lecture used in Study 2 focused on gene by environment interactions, a popular topic in the field of genetics. We employed a different young female instructor for Study 2 with some background knowledge on the lesson topic.

This study was mainly designed for the purpose of replicating and testing the robustness of the findings of Study 1. We sought to investigate whether the findings from Study 1 would remain consistent even when a different instructor and lesson topic were used.

Method

Participants

Participants were 118 undergraduate students (65 males, 52 females, 1 unidentified) enrolled in an introductory psychology course at a large Midwestern University in the United States. Participants received course credit for taking part in the study. The sample was 66.7% White, 10.9% East Asian, 6.3% South Asian, 4.7% African American, 3.6% Latino, and 5.5 % Multiracial and Other. The majority of participants were in their first or second year of university (90.7%), and ranged in age from 18 to 28 ($M = 19.16$, $SD = 1.66$). 96% reported being native English speakers.

Materials

First Impression Videos. A young East Asian female actor portrayed the instructor for the first impression and instructional videos used in Study 2. The actor in this video was a graduate student with extensive teaching experience. In the first impression video, the actor introduced herself and described her interest in the subject matter. This was filmed while she was standing in the front of a classroom, behind a podium, with a whiteboard in the background. This particular setting was chosen to simulate a professor lecturing in a typical college classroom.

A similar verbal script was used for the good and bad first impression videos, so the quality of the first impression was manipulated through tone of voice and body language. For the good first impression, the actor portrayed confidence, enthusiasm for the subject matter, and an interest in teaching the subject matter to the viewers. This was accomplished by using a strong and positive tone of voice as well as enthusiastic and relevant gestures and facial expressions.

To make a bad first impression, the actor displayed lack of interest in both the subject matter and in teaching. This was demonstrated by a relatively monotonous and negative tone of voice, a disinterested facial expression, and frequent fidgeting, including taking a drink from a water bottle and looking at a cellphone mid-sentence.

Instructional Videos. The topic of instruction was Gene by Environment Interactions. This is a popular topic typically covered in upper level undergraduate or graduate level courses related to the field of genetics, and since the participants of this study were mostly first or second year undergraduate students, we believed that it would be a topic that most students were unfamiliar with, but would be interested to learn about. Identical slides were used in the good and bad instruction presentation slides and both videos showed the actor giving a lecture on the topic. The edited video that participants viewed showed a full screen PowerPoint slide, with a small window on the side of the screen where the instructor was visible. The instructor was standing in front of a podium, similar to the ones that most college professors lecture in front of, particularly when using a microphone or other audio/video system.

The good instruction video was well-organized and included complete explanations and elaborations. The bad instruction video maintained the same order of slides, but the instructor was made to appear less organized by needing time to remember what she needed to say for some slides, and using scripted filler words such as “um.” Additionally, within each slide,

information was covered in less detail and was sometimes presented in a different, less coherent order than in the good instruction video. An example of the script used to present a slide in the good and bad instruction conditions is included in Appendix C. All information that was later tested on the quiz was fully covered in both instruction videos.

Design and Procedure

The study employed a 2 (First Impression: Good/Bad) x 2 (Instruction: Good/Bad) experimental design (First Impression x Instruction). Participants were randomly assigned to one of the four conditions. Using an experimental design allowed us to see the effects of varied teaching quality in a transparent, controlled, and replicable manner.

The experiment took approximately 45 minutes, and participants were tested independently. Up to three subjects participated simultaneously in a single experimental room, each seated in front of his/her own computer and joystick, listening to the video through headphones and rating the video using the joystick provided. Participants did not interact during the.

After collecting signed consent forms from participants, an experimenter provided a brief description of the research protocol and made sure the participants understood the procedures involved. Then participants were asked to put on their headphones to view the video. The first impression and instructional video were combined into a single file to make it clear that the first impression was an introduction to the instruction that followed. During the entire video (19~21 minutes long, depending on the condition), the participants were asked to rate the video on the following two evaluative criteria: 1) level of learning/understanding and 2) evaluation of the instructor/instruction. The participants were asked to provide ratings continuously throughout the entire video, while keeping their (dominant) hand on the joystick the entire time. No button

pressing was required to record the data – the participants simply had to move (or keep) the joystick to the appropriate point in the rating scale provided on the screen.

After participants completed the video viewing/joystick rating task, the experimenter opened an online quiz that included demographic variables, a measure of student learning, and a teacher evaluation questionnaire, and asked the participant to complete it. This allowed us to see how the process of learning (via level of learning recorded) mapped onto the amount of learning that actually occurred. After completing the online quiz, participants were debriefed on the purpose and goals of the research.

Capturing Real-Time Student Ratings

The same joystick and data collection software (DARMA) used in Study 1 were used to capture students' continuous ratings of instruction in Study 2.

Measures

Demographic Variables. To assess comparability across conditions, participants answered questions about their age, gender, race/ethnicity, year in school, and English as a first language status.

Student Learning. Learning was assessed through a quiz with fourteen multiple-choice questions. Questions assessed important concepts and definitions covered in the instructional video. The sum of correct responses to quiz questions (0-14) was used as an indicator of student learning.

Teacher Evaluation. The final portion of the online questionnaire asked participants to rate the instructor in the video on a scale of 1-10 on the following fourteen dimensions (following Ambady & Rosenthal, 1993): accepting, active, anxious, attentive, competent, confident, dominant, empathetic, honest, likeable, optimistic, professional, supportive, and

warm. Students also provided overall ratings of the instructor on a scale of 1-5 in terms of how excellent the teacher was, how clear and understandable the instructor was, how well prepared the instructor seemed, and how interesting the lesson was.

Results

Analysis

Descriptive statistics for student learning outcomes, teacher evaluations, and joystick ratings can be found in Tables 4.5 and 4.6. As with Study 1, no significant differences were found between the four experimental groups regarding age, year in school, gender, and English as a first language status. Consequently, these variables were not included in further analyses. Dependent measures were analyzed using a 2 (first impression: good or bad) × 2 (instructional quality: good or bad) multivariate analysis of variance (MANOVA), with both factors between subjects. This allowed us to examine the main effect of both first impression and instructional quality on student learning and instructor evaluation.

Then, graphs of the joystick ratings were examined, each aggregated by condition to identify the mean fluctuations in participant ratings of both level of learning and evaluation of the instruction. We identified several key time points pertaining to any noticeable dips and rises in the continuous ratings and examined which parts of the lesson triggered these changes in both the ratings about the instructor and level of learning. These time points were also examined in relation to achievement scores in the posttest quiz.

Table 4.5. *Study 2 Descriptive statistics: Mean scores for each condition*

Dependent Variable		Condition							
		GG		BG		GB		BB	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Student Learning	Total Quiz Score	5.60	1.73	5.37	2.10	3.84	2.03	4.41	2.10
Perceived Teacher Personality Traits	Accepting	7.37	1.96	6.74	1.51	4.04	2.59	4.66	2.13
	Active	4.87	2.67	4.81	2.08	2.56	1.61	3.14	2.57
	Anxious	3.70	2.52	4.70	2.60	5.56	2.66	5.10	3.05
	Attentive	6.43	1.98	5.74	2.03	2.44	1.89	3.21	2.11
	Competent	7.6	2.03	6.74	2.12	3.20	2.55	3.86	2.08
	Confident	6.83	2.12	5.81	2.39	2.24	1.81	2.97	1.74
	Dominant	4.27	2.15	4.41	2.34	1.68	1.65	2.55	1.50
	Empathetic	5.50	2.15	5.22	1.50	3.16	2.36	3.69	1.89
	Honest	7.53	1.38	6.81	1.98	4.92	2.91	6.17	2.36
	Likeable	6.83	2.34	6.37	2.32	3.20	2.45	3.62	2.41
	Optimistic	7.00	2.03	6.67	2.15	2.76	2.28	3.69	2.55
	Professional	8.03	1.54	7.52	1.99	2.64	2.46	3.52	2.53
	Supportive	6.50	2.03	6.74	2.10	2.68	2.63	3.79	2.32
	Warm	6.37	2.66	5.90	2.12	3.12	2.76	3.69	2.32
Overall Teacher Ratings	Excellent Teacher	2.97	1.10	3.11	.97	1.40	.87	1.59	.83
	Clear & Understandable	3.50	1.04	3.67	.88	1.72	1.06	1.86	1.13
	Well-Prepared	4.10	1.03	3.63	1.08	1.56	.96	1.79	1.01
	Interesting	3.13	1.25	3.19	1.11	2.36	1.29	2.31	1.34

Student Learning

As shown in Table 4.8, There was a significant main effect of instructional quality on posttest quiz scores, $F(1, 115) = 12.86$ $p < .001$, where the good instruction condition ($M = 5.49$, $SD = 1.92$) produced higher quiz scores than the bad instruction condition ($M = 4.13$, $SD = 2.07$). There was no main effect of first impression condition on student learning, and no interaction between instructional quality condition and first impression condition (Fs < 1). Descriptive statistics for both instructional quality and teacher evaluations can be found in Table 4.5 and joystick mean ratings are shown in Table 4.6.

Table 4.6. *Study 2 Posttest quiz scores and joystick mean ratings (by condition)*

Dependent Variable	Condition											
	GG			BG			GB			BB		
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
Total Quiz Score	5.60	30	1.73	5.37	27	2.10	3.84	25	2.03	4.41	29	2.10
Evaluation of Instruction	6.83	30	21.00	-.44	27	20.52	-52.08	25	28.92	-41.76	29	28.62
Engagement/Learning	15.77	30	28.73	15.96	27	26.96	-24.92	25	32.56	-17.69	29	31.66

Teacher Evaluations

Table 4.7 shows correlations between real-time joystick ratings (average scores across the lesson) and post-test teacher evaluation ratings. As expected, the two evaluative scales are highly significantly ($p<.001$) correlated, ranging from $r = .66$ to .84. This suggests that the way students perceive and instruction in real time has predictive consequences on the way they evaluate the teacher and the teaching quality after the culmination of a lesson.

Table 4.7. *Study 2 correlations between DARMA Joystick ratings & post-test teacher evaluation ratings*

Variables	1	2	3	4
1. Joystick Engagement/Learning	-			
2. Joystick Instructional Quality	.74	-		
3. Posttest Teacher Personality traits	.73	.66	-	
4. Posttest Overall Teaching Evaluation	.78	.70	.84	-

Instructional quality influences. MANOVA analyses showed that there was a significant main effect of instructional quality on participant ratings for all of the fourteen specific instructor trait dimensions (see Table 4.8). Compared to the bad instruction condition, participants rated the instructor in the good instruction condition as significantly more *accepting*, $F(1, 115) = 47.28$, $p < .001$, *active* $F(1, 115) = 18.93$, $p < .001$, *attentive*, $F(1,115) = 72.94$, $p < .001$, *competent*, $F(1,115) = 76.16$, $p < .001$, *confident*, $F(1,115) = 90.98$, $p < .001$, *dominant*,

F(1,115) = 35.99, $p < .001$, *empathetic*, F(1, 115) = 26.02, $p < .001$, *honest*, F(1,115) = 15.13, $p < .001$, *likeable*, F(1,115) = 49.72, $p < .001$, *optimistic*, F(1,115) = 70.37, $p < .001$, *professional*, F(1,115) = 131.25, $p < .001$, *supportive*, F(1,115) = 61.41, $p < .001$, and *warm*, F(1, 115) = 333.47, $p < .001$, and significantly less *anxious*, F(1,115) = 4.79, $p < .05$.

Instructional quality also resulted in significant differences on the three global instructor ratings, where the instructor in the good instruction condition was rated significantly higher than the bad instruction condition on being an *excellent teacher*, F(1,115) = 73.04, $p < .001$, being *clear and understandable*, F(1,115) = 83.27, $p < .001$, being *well prepared*, F(1,115) = 126.42, $p < .001$, and *interesting*, F(1,115) = 11.98, $p < .001$.

Table 4.8. *Study 2 main effects of first Impression and instructional quality*

Dependent Variable		Independent Variables							
		First Impression				Instructional Quality			
		F	*df*	Partial η^2	Sig.	*F*	*df*	Partial η^2	Sig.
Student Learning	Total Quiz score	.21	1/115	.00	.65	12.86	1/115	.11	.00
Perceived Teacher Personality Traits	Accepting	.00	1/115	.00	.99	47.28	1/115	.31	.00
	Active	.33	1/115	.00	.57	18.93	1/115	.15	.00
	Anxious	.28	1/115	.00	.60	4.79	1/115	.04	.03
	Attentive	.01	1/115	.00	.92	72.94	1/115	.41	.00
	Competent	.06	1/115	.00	.81	76.16	1/115	.42	.00
	Confident	.14	1/115	.00	.71	90.98	1/115	.46	.00
	Dominant	1.87	1/115	.02	.17	35.99	1/115	.25	.00
	Empathetic	.11	1/115	.00	.74	26.02	1/115	.20	.00
	Honest	.41	1/115	.00	.53	15.13	1/115	.12	.00
	Likeable	.00	1/115	.00	.96	49.72	1/115	.32	.00
	Optimistic	.48	1/115	.00	.49	70.37	1/115	.40	.00
	Professional	.20	1/115	.00	.66	131.25	1/115	.55	.00
	Supportive	2.46	1/115	.02	.12	61.41	1/115	.37	.00
	Warm	.01	1/115	.00	.92	33.47	1/115	.24	.00
Overall Teacher Ratings	Excellent Teacher	.84	1/115	.01	.36	73.04	1/115	.41	.00
	Clear & Understandable	.62	1/115	.01	.43	83.27	1/115	.44	.00
	Well-Prepared	.37	1/115	.00	.54	126.42	1/115	.54	.00
	Interesting	.00	1/115	.00	1.00	11.98	1/115	.10	.00

First impression did not produce any significant main effects on any of the instructor trait scores or overall instructor ratings. There were two significant interactions between instructional

quality and first impression condition. Both interactions involved the specific instructor traits of confident, $F(1, 115) = 5.00$, $p = .03$ and honest, $F(1, 115) = 5.55$, $p = .02$ (see Table 4.9)

Table 4.9. *Study 2 Significant Interaction Effects: First Impression * Instruction Interaction*

First Impression * Instructional Quality				
Dependent Variables	*F*	*df*	*Partial* η^2	*Sig.*
Confident	5.00	1/115	.05	.03
Honest	5.55	1/115	.05	.02

Joystick Ratings by Condition

The joystick data obtained from the DARMA software were aggregated by condition to produce graphs as shown in *Figures 4.6* to *4.9*. These graphs illustrate the mean changes in joystick ratings on two separate evaluative dimensions: evaluation of the instruction/instructor and level of learning. In the BB condition (bad first impression/bad instruction), the initial dip in both rating dimensions are clearly evident around T=120~125 (T1), which indicate between 60 to 62 seconds into the lesson (see *Figure 4.6*). This is approximately the time point when the first impression introduction ends and the lesson on genetics begins. And since this is the bad first impression condition, the initial drops in ratings were to be expected. The ratings on both evaluative dimensions remain below zero (indicating negative evaluations) for most of the lesson, but several time points are noteworthy due to their precipitous nature.

First, the largest noticeable drop in both evaluative dimensions occurs at around T = 1015 (T2), which is around 8 minutes and 27 seconds into the video. This drop occurs shortly after the instructor provides her personal example on a topic she is lecturing on. While discussing about monozygotic twins reared apart, she mentions a documentary that she recently watched, called "Twinsters", and proceeds to recommend it. However, she does not explain what the documentary is about and how it is connected to the topic in hand, thus causing some confusion and incoherence in the lesson. She then goes on to say "okay, now let's try to get back on track",

indicating that she has been off track prior to this realization. She also apologizes and corrects herself again while she tries to remember what she was saying, creating even more confusion to the student participants.

The next noticeable dip in ratings occur around T = 1456, or approximately 12 minutes 8 seconds into the lesson. This drop aligns with the part of the lesson where the instructor proceeds to walk over to her computer to try to look through her notes on what she needs to talk about next because she has forgotten what the contents of the next slide is about. This void in lesson is accompanied by multiple filler words, such as "um" and long pauses, as well as an unrelated small talk about her own children that has no bearing on the contents of the lesson.

The several sudden increases in the ratings are also noteworthy although these are far less prominent than the decreases in the bad instruction condition. The most noticeable increase in ratings occurs at approximately T=1950 (T3), or 16 minutes and 15 seconds into the video. This increase in ratings coincides with the part of the lecture where the instructor proceeds to switch gears from explaining a very text heavy slide about the study procedures (the Bakersman-Kranenburg study about the link between risk alleles and ADHD) to finally unveiling, using a more concise slide, the major findings of that study. This transition appears to have caused a noticeable positive change in both the level of learning and evaluation of the instruction.

The joystick ratings from the GG (good first impression, good instruction) condition are shown in *Figure 4.9*. As with the BB condition graph, three noteworthy time points are indicated as T1, T2, and T3. The first time point (T1) that we measured is at T=120, or approximately 60 seconds into the video. This coincides with the end of the first impression introduction. The ratings remain relatively steady although the level of learning decreases slightly afterwards before continuing to increase steadily throughout the lecture. The first noticeable decrease in

ratings occurs at around T=1485, or 12 minutes 20 seconds into the video when the topic of sensitivity hypothesis (or plasticity genes) is first introduced. The drop in ratings coincides with the introduction of multiple scientific words and phrases in a rather text-heavy slide. These words and phrases are not explained fully until the upcoming slides so it is possible that this triggered a temporary decrease in students' level of engagement.

A more noticeable decrease in ratings occurs at around T = 1755 (T2), or approximately 14 minutes 40 seconds into the video. This dip in ratings coincides with another text-heavy slide where the instructor is explaining the study by Bakermans-Kranenburg and colleagues. Without fully explaining the study in an understandable manner, the instructor reads much of the text on the slide, in a jargon laden manner.

In contrast, a noticeable positive shift in ratings occurs around T = 1356, or approximately 11 minutes 15 seconds, when the instructor reminds the students about something she explained earlier in the lecture and reiterates what the word (e.g. allele) means. Another small increase in ratings occurs at around 17 minutes 12 seconds, where the instructor reiterates something she had mentioned in an earlier part of the lesson and provides a further, more thorough explanation of it. This type of repeated exposure to scientific terms and phrases appears to have increased both students' level of learning and evaluation of the instruction in this lesson.

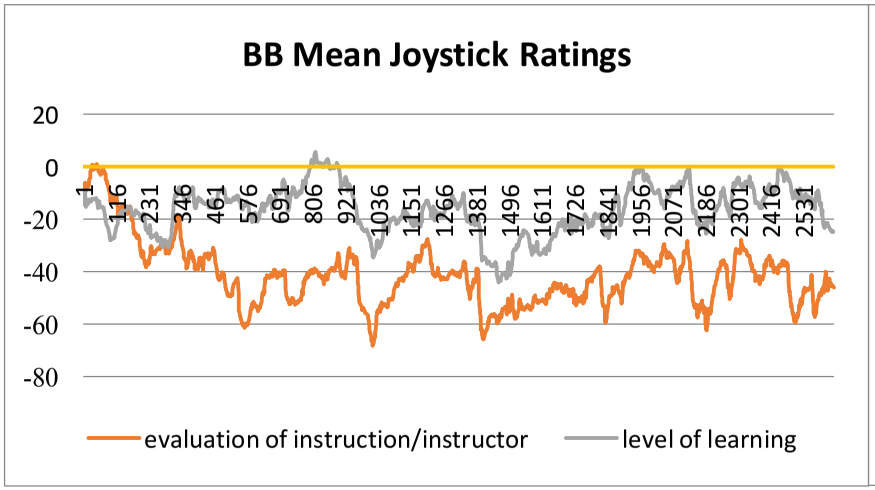

Figure 4.6. BB condition: Aggregated mean joystick ratings across the lesson (plotted every half a second).

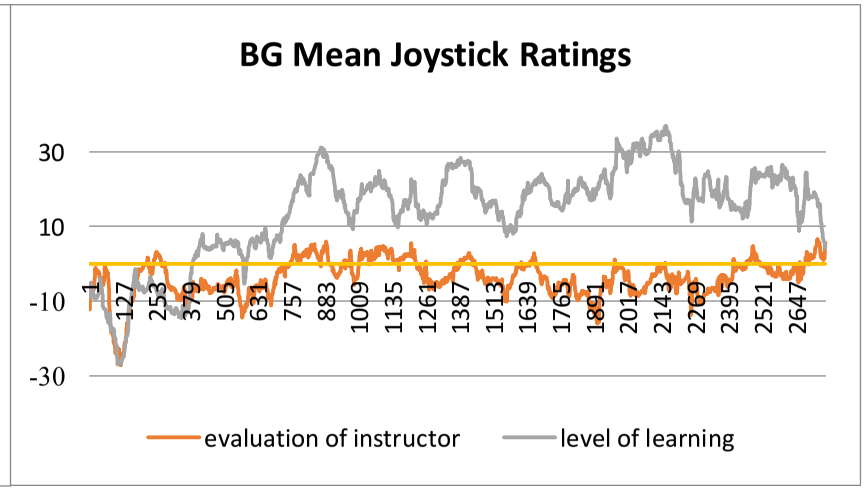

Figure 4.7. BG condition: Aggregated mean joystick ratings across the lesson (plotted every half a second).

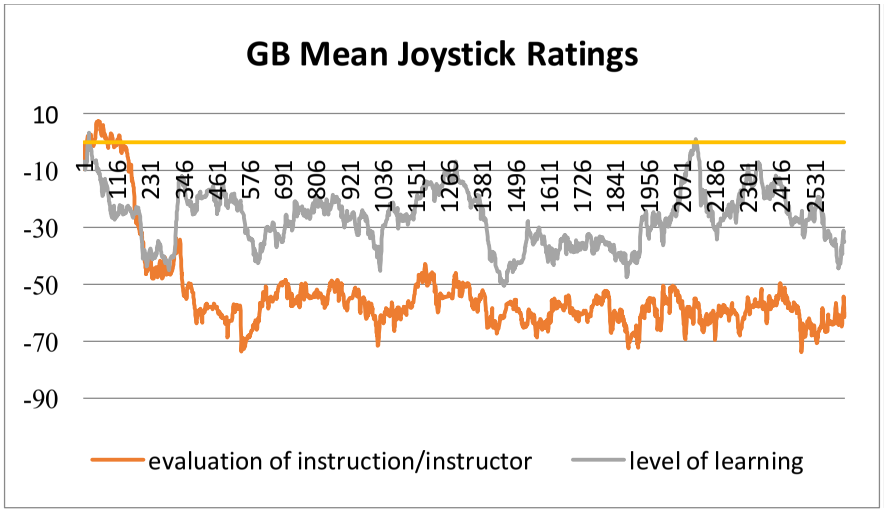

Figure 4.8. GB condition: Aggregated mean joystick ratings across the lesson (plotted every half a second).

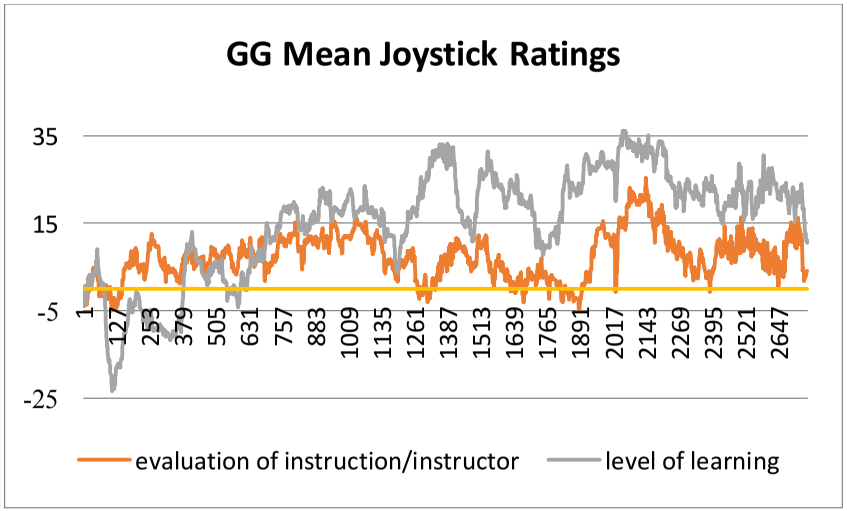

Figure 4.9. GG Condition: Aggregated mean joystick ratings across the lesson (plotted every half a second)

High Versus Low Achievers

To examine how the students that performed well on the posttest quiz differ in their learning processes compared to their lower performing counterparts, we dummy coded the posttest quiz score as high versus low (above or below the average score) and performed a logistic regression.

The results showed that compared to their high achieving peers, lower achieving participants provided significantly lower ratings on both evaluative dimensions (level of learning & evaluation of the instruction) on the two significant time points plotted (see Table 4.10). Specifically, at T2, or at the largest noticeable decrease in joystick ratings, the lower achieving participants provided an average rating of -30.73 for the Y dimension (evaluation of the instruction) while the higher achievers reported an average rating of -11.87. For the X dimension (level of learning), the ratings were -12.37 and 8.76 for the low versus high achievers, respectively. At T3, the lower achievers provided an average rating of -41.94 for the Y dimension and -11.96 for the X dimension, with a difference of about 30 standardized points. For the X dimension (level of learning), the between-group differences in joystick ratings were about 16 standardized points. The between-group differences in both time points (T2 and T3) were statistically significant.

Table 4.10. *Study 2 Between-group differences in joystick ratings (high versus low achievers)*

High/Low	Mean/SD	T1_Instruction Eval	T1_Level of Learning	T2_Instruction Eval	T2_Level of Learning	T3_Instruction Eval	T3_Level of Learning
Low	Mean	.95	-12.04	-30.73	-12.38	-41.94	-16.73
	SD	24.81	30.99	45.97	42.68	42.68	48.76
High	Mean	-1.79	-7.45	-11.87	8.76	-11.96	.58
	SD	25.85	27.25	48.21	43.42	54.37	43.09

Note. All values were standardized (M=0. SD=1).

Discussion

Study 2 tested whether the findings of Study 1 would replicate even when a different instructor and a lesson topic were used. In general, our findings from Study 2 did replicate what we found in Study 1. Even when factors related to the instructor and lesson were changed, instructional quality continued to have a strong effect on both learning and teacher evaluations, whereas first impression did not have any significant effect on student learning. In this study, the first impression effects were even smaller than those found in Study 1, such that we were unable to find any significant main effects of first impression on teacher evaluations. This may be due to the ways in which we manipulated the first impression videos – even though we tried to vary the different conditions in the exact same way, this may not have been possible due to the varied nature of the different instructors. We did find some interaction effects in study 2, such that for the traits confident and honest, the difference in ratings between the good and bad instruction conditions were greater when the teacher had made a good first impression. While this effect was not large, it suggests that students may infer that an instructor who makes a bad first impression followed by a disorganized, poor lecture do so because he or she either lacks confidence or is dishonest in nature.

Nonetheless, these results suggest that first impression that teachers make matters far less than the quality of the teaching that follows. In other words, students are able to focus on the quality of instruction rather than just the initial impression an instructor makes. This contradicts existing popular beliefs about the lasting effects of first impression, at least in the context of teaching and learning. This is encouraging, particularly from a pedagogical point of view, as it suggests that a teacher might be able to "survive" a bad first impression, and redeem him- or herself in the eyes of the students by providing good instruction.

As with Study 1, this study also used a novel data paradigm that allowed us to obtain continuous feedback from students on their experience of a lesson. When looking at how students experienced and learned from the lesson in real-time, we were able to see similar patterns as we did in Study 1. For example, we found that full explanations and concrete examples for newly introduced scientific concepts enhanced students' level of learning. Shifting gears periodically by presenting materials in a different way also helped to sustain student attention and lead to better ratings and learning overall. We also found that the two most significant positive upward shifts in ratings occurred when the instructor provided a brief review about a concept that she introduced earlier in the lesson. These subtle reminders or reviews of difficult scientific concepts were instrumental in enhancing both students' level of learning and evaluation of the instruction.

On the other hand, we found that text-heavy PowerPoint slides led to decreased level of learning and negative evaluation of the instruction. In particular, instruction ratings decreased noticeably when the instructor appeared disorganized and unprepared, by using many filler words, taking long pauses, and talking about personal experiences/examples unrelated to the topic. These patterns were, in general, consistent with those found in Study 1, suggesting that even seemingly insignificant things instructors do or don't do during a teaching session, such as giving brief reviews of concepts, providing relevant examples, using too much or not enough text or graphs in slides, can all influence how much students learn from the lesson and how competent the instructor appears.

Finally, Study 2 also found that students that performed higher on the posttest quiz differ from their lower achieving counterparts in that they tend to be less negatively influenced by parts of the lesson that reflect poor instructional quality and more positively influenced by parts that

reflect effective teaching. This may be related to individual differences in learning motivation, or some other type of resiliency that allows some high achieving students to learn more, or be less distracted, even in less than ideal learning environments. These potential explanations are interesting avenues for further research but these findings should first be replicated in subsequent studies to ensure that it is a robust finding that is not unique to this particular dataset.

General Discussion

By using an experimental paradigm, we were able to replicate the findings by Samudra and colleagues (2016) showing that first impression that teachers make has negligible effects on student learning compared to the actual quality of the lesson that follows. This suggests that making a strong first impression is only the beginning of the work of being an effective instructor, and cannot serve as a shortcut to obtaining a positive evaluation of instruction by students. Studies 1 and 2 suggest that what students learn from a lesson and how they evaluate the quality of instruction afterwards are predominantly determined by the specific things that the instructor did during the teaching process, and not the qualities he or she showed during the first minute of class.

The continuous data collection technique used in studies 1 and 2 allowed us to examine these processes in detail. It allowed us to isolate and identify the specific things that the instructor did during teaching and how students experienced and learned from them. We found that even the small things that instructors do, whether intentional or not, can influence student learning and their feelings about the instruction in measurable ways. Things such as providing relevant examples, small recaps throughout the lesson, and not using too much text or difficult graphs and tables in the Powerpoint slides used during a lesson should be encouraged, and

distracting behaviors such as disorganization, long pauses, and tangential conversations, should be discouraged.

A notable feature of the study was the identification of points in the ostensibly "good" instruction where student evaluation did not correspond to our intent. This is an exciting observation, as it shows the power of the DARMA-based approach to identify areas of teaching that could be improved in a way that current course evaluations do not.

This method opens up a way to experimentally test questions about how to organize and present information in a lecture. These can range from general questions such as what is the best way to keep students engaged when you are presenting something complex, to the ability to identify specific points of confusion or disengagement in a lecture.

It is important to replicate these findings in subsequent studies to ensure that they are generalizable across different settings and academic disciplines. Also, further research should examine how real-time student ratings would change once we isolate and address the specific things identified in our studies as having an influence on student ratings. For instance, it would be interesting to see how the ratings would change in a new lesson if we fixed the teaching methods that were perceived negatively in our current studies. This experimental paradigm and the data collection method holds great promise and has the potential to provide even more useful information about the specific teaching processes and how students experience them.

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CHAPTER 5

A Culturally Varied Answer to a Universal Question

Because teaching and learning are so important, it's easy to see our culture's ways of organizing them as either the best or only way to do so. By examining the broader cultural context in which teaching and learning occurs, we can both see what issues are universal and also identify beliefs and practices that could be used to improve education. The three studies of my dissertation demonstrate this.

Chapter 2 explores the universal as well as the culturally unique aspects of parental involvement that could help reshape the way we think about parental involvement in the U.S. We found that parental SES variables influence parental involvement behaviors in culturally varied ways, such that in some of the East Asian countries surveyed, parental SES, especially household income, was a strong predictor of parental involvement, whereas this was not the case with our European samples. We also found that the types of parental involvement that predicts academic success varies across cultures suggesting that there is no magic formula that universally applies to all parents when it comes to being involved in education. Instead, culture matters, and parents work within the constraints that their culture imposes, whether it be general expectations about parenting or the openness of schools to having parents participate in different ways.

One concern that this study raises is the issue of educational inequity in some parts of the world. The substantial association between educational spending and parental SES (particularly household income) in the two East Asian locations included in our study reflects an obvious

advantage that wealthier parents have over their less wealthy counterparts in ensuring high quality education for their children. This reflects both an educational climate that allows the wide array of supplementary education options to exist and a dysfunctional public school system that perpetuates a need for it. And it is possible that this is a more widespread issue that spreads far beyond the two East Asian locations included in this study. Although we only looked at four countries/economies in this study, given the growing popularity of shadow education in other parts of the world, including North America, Eastern Europe, Southeast Asian, and several African countries (Dang & Rogers, 2008), it would not be surprising to find similar patterns in other parts of the world. To address this issue, more systematic and comprehensive research and policy efforts are needed. And recognizing that such educational inequality exists in many parts of the world, through international research, is the first step in finding ways to address this problem.

The study presented in Chapter 3 also supports the idea that culture dictates the ways in which parents and students work together to succeed academically. This study found that the relationship between parental involvement as reported by parents and those perceived and reported by students can differ substantially across cultures. Specifically, the parental involvement behaviors that positively (or negatively) influence student perceptions about their own parental support in education depends on the different opportunities for the parents to be involved in their own respective cultures. For example, in most East Asian cultures where large private education systems are in place (i.e. private tutoring and cram schools), parents are more likely to choose this route to help their children succeed. And if in a given society, such efforts are deemed necessary or instrumental for academic success, students in that society are more likely to perceive their parents as being supportive if they engage in such involvement.

Unfortunately, these findings also highlight the potential social and educational inequality that exists in many parts of the world, although the pervasiveness of this issue will not be fully understood until further research is conducted. Nonetheless, cross-cultural investigations highlighting such culturally unique beliefs and expectations are extremely valuable as it advances our understanding of the complicated processes through which parenting can benefit students. Our findings cannot offer any advice on the best ways for parents to be involved, but it shows that the best ways for parents to be involved in their children's education depends on the cultural context in which it occurs. This open-ended answer creates new avenues for further research, where the central focus should lie on trying to understand the big picture, and acknowledging the multiple contextual factors involved, rather than simply trying to find that one elusive magic formula that does not seem to exist.

The third study of this dissertation presented in Chapter 4 shifts the focus away from parenting to examine teaching as another form of nurturing. This study furthers our understanding of how students experience and learn from the teaching efforts they receive by looking at the specific processes involved in learning. The 'process' part of the learning equation is not examined often in existing literature that tends to focus mostly on the output part of the equation. That output in turn generally consists of achievement results. This may be because of the relative difficulty in assessing the actual processes involved in learning. This study uses a novel paradigm to obtain continuous student reactions in real-time as they learn from a recorded lecture. This allowed us to closely examine the relationship between the 'process' and the 'outcome' part of the equation. Specifically, we were able to identify and isolate the specific aspects of teaching that has measurable consequences on student learning.

We found that even some seemingly insignificant things that instructors do during a lesson can influence how students learn and feel about the instruction. For instance, professors are often guilty of using too much text or too many graphs and tables in their PowerPoint slides (often unintentionally), and this study shows that such small things can result in measurably negative student responses. On the other hand, teaching practices that are typically perceived as being effective, such as providing relevant examples, full explanations, and small recaps throughout the lesson, should be encouraged as they were shown to have a positive influence on student learning, at least within the scope of our study.

I am particularly excited by the potential of the continuous response technique to help evaluate specific teaching practices. Recently there has been a proliferation of guides that lay out sets of recommended teaching practices, such as the 62 that Lemov (2015) describes. Because of the complexity of teaching, it is difficult to connect any one specific practice to student learning. But the continuous response technique provides a way of testing the claims that Lemov and others make about the effects of particular tactics on student engagement, such as providing a short introductory "hook" that captures what's interesting and engaging about the material to be learned. Although I am beginning with college students and ideas from the thin-slice literature, I hope to use the continuous response technique as a way of evaluating how students of different ages experience their education.

This method also has the potential to see how improving and/or reinforcing various aspects of teaching identified as having significant consequences could change the way students learn from the same lesson. Future research should focus on isolating specific aspects of teaching, making adjustments, and then seeing how students experience the newly improved

lesson. Doing this would not only confirm which teaching practices are effective or not effective, but also add to the validity of using this type of data collection method to improve teaching.

Finally, cross-cultural comparisons using this experimental paradigm could also yield some interesting cultural patterns that could add value to the way we see processes involved in learning. By replicating these findings in subsequent studies, in different cultural contexts, we would be able see learning processes that are both universal as well as culturally specific.

Overall, the three studies included in this dissertation suggest that different cultures breed different ideas about parenting and teaching. This is because different school systems provide different opportunities for parents and teachers to be involved in children's education. Parenting and teaching goals can also differ dramatically across cultures depending on the kinds of educational climate/attitudes that the society breeds. I believe all these different components fit together and propel one another like a system of gears. Like a set of gears, though, we need to understand how the parts fit together in order to understand the systems.

I believe the combination of methods used in this dissertation to examine cross-cultural differences in education is an extremely fruitful approach as it increases the scope of the lens through which we view education. Going forward, I hope to further unravel the ways in which learning processes vary across cultures by continuing to incorporate a range of different methodological approaches into my research program.

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APPENDICES

APPENDIX A: Chapter 2 Final SEM Model Estimates

Table 6.1. *Final SEM model parameter estimates, factor loadings, and total variance explained (Belgium, Germany)*

	Variable	Belgium			Germany		
		Unstandardized Coefficient	S.E.	Standardized Coefficient	Unstandardized Coefficient	S.E.	Standardized Coefficient
Structural Coefficients	School Involve-> Achievement	-14.623**	1.435	-.141	-22.860**	1.526	-.241
	Home Involve-> Achievement	1.380	1.443	.013	-7.171**	1.677	-.069
	Ed Spending-> Achievement	1.321	.947	.020	-3.148**	.905	-.057
	Mom Ed -> Achievement	19.188**	1.180	.202	12.534**	1.279	.150
	Dad Ed -> Achievement	13.019**	1.161	.139	7.833**	1.334	.094
	Income -> Achievement	14.131**	0.835	.289	14.134**	.912	.294
	Mom Ed -> Home Involve	-.009	.018	-.010	.039*	.017	.048
	Dad Ed -> Home Involve	.011	.017	.012	.015	.018	.019
	Income -> Home Involve	.047**	.009	.099	-.023*	.010	-.050
	Mom Ed -> School Involve	-.018	.017	-.020	.021	.018	.023
	Dad Ed -> School involve	-.014	.017	-.015	-.034	.019	-.039
	Income -> School Involve	-.016	.009	-.034	-.044**	.011	-.086
	Mom Ed -> Ed Spending	-.018	.028	-.012	-.040	.031	-.027
	Dad Ed -> Ed Spending	.048	.027	.034	.063*	.032	.042
	Income -> Ed Spending	.042*	.014	.058	.084**	.019	.097
Factor Loadings	Achievement->Math	1.000	.000	.916	1.000	.000	.919
	Achievement->Science	1.101**	.004	.979	1.101**	.004	.970
	Achievement->Reading	1.018**	.004	.919	1.018**	.004	.891
R^2	School Involve		.003			.010**	
	Home Involve		.010**			.004	
	Ed Spending		.005*			.012**	
	Math Achieve		.840**			.845**	
	Science Achieve		.958**			.941**	
	Reading Achieve		.845**			.794**	
	Academic Achieve		.268**			.272**	

Table 6.2. *Final SEM model parameter estimates, factor loadings, and total variance explained (Hong Kong, Korea)*

	Variable	Hong Kong			Korea		
		Unstandardized Coefficient	S.E.	Standardized Coefficient	Unstandardized Coefficient	S.E.	Standardized Coefficient
Structural Coefficients	School Involve-> Achievement	-4.549**	1.007	-.063	2.712*	1.061	.035
	Home Involve->Achievement	.455	.999	.007	5.761**	1.205	.065
	Ed Spending-> Achievement	5.496**	.931	.092	11.220**	.954	.181
	Mom Ed -> Achievement	.728	1.000	.012	14.949**	1.545	.131
	Dad Ed -> Achievement	5.305**	.991	.087	6.211**	1.896	.045
	Income -> Achievement	5.367**	0.647	.134	6.648**	.738	.139
	Mom Ed -> Home Involve	.123**	.014	.141	.037*	.018	.029
	Dad Ed -> Home Involve	.082**	.014	.093	.025	.022	.016
	Income -> Home Involve	.051**	.009	.088	.068**	.007	.127
	Mom Ed -> School Involve	.037**	.014	.044	.044*	.021	.030
	Dad Ed -> School involve	.031*	.014	.037	.061*	.025	.034
	Income -> School Involve	-.024**	.009	-.043	.126**	.008	.202
	Mom Ed -> Ed Spending	.142**	.016	.140	.037	.023	.020
	Dad Ed -> Ed Spending	.068**	.016	.066	.148**	.028	.067
	Income -> Ed Spending	.219**	.010	.325	.384**	.009	.500
Factor Loadings	Achievement->Math	1.000	.000	.855	1.000	.000	.880
	Achievement->Science	1.101**	.004	.991	1.101**	.004	.974
	Achievement->Reading	1.018**	.004	.868	1.018**	.004	.878
R^2	School Involve		.004*			.048**	
	Home Involve		.063**			.019**	
	Ed Spending		.185**			.271**	
	Math Achieve		.731**			.775**	
	Science Achieve		.982**			.948**	
	Reading Achieve		.754**			.771**	
	Academic Achieve		.062**			.135**	

APPENDIX B: Sample Quiz Questions from Chapter 4 (Study 1)

Sample Factual Question:

Which factors are associated with higher academic achievement within a single country?

A. Enjoyment of subject
B. Greater classroom socioeconomic diversity
C. Higher academic self-concept
D. A and C only
E. All of the above

Sample Conceptual Question:

Researchers from Qatar argue that they perform poorly on TIMSS tests only because their mathematics curriculum is so different from that of Western countries. If the Qatar researchers are correct, which of the following should be True?

A. Students from Qatar should improve their TIMSS performance on the next wave of data collection
B. Students from Qatar should decline in TIMSS performance on the next wave of data collection
C. Students from Qatar should perform similarly on TIMSS and PISA
D. Students from Qatar should perform better on PISA than TIMSS
E. None of the above

APPENDIX C: Good and Bad Instruction Gene vs Environment Lesson Script (Study 2) for Three Lecture Slides (From Chapter 4)

Lecture Slide Number	Good Instruction Script	Bad Instruction Script
1	Today, we'll be looking at the role of both genetics and environment and how each of those things together shape a person. And these things determine not just on obvious phenotypic traits like eye color, hair color, height, and so on, but also things that like behavior, personality, and potentially even health risks. We'll be talking about the ever-so-popular nature versus nurture debate, we're going to discuss its validity, and then talk about this fascinating idea of gene by environment interactions. In other words, we're going to learn about the different contributions that genetics versus the environment has on a person. For example how can we tell if a particular trait of a person is due to genetics or environment? Do they both matter? Does one matter more than the other? And so on.	Today, we'll be looking at the role of genetics, or patterns of inheritance in shaping a person's behavior, personality and phenotypic traits. We will be talking about the nature versus nurture debate, its validity, and then talk about gene by…. Um environment interactions, I think??. Ummm. In other words, we're going to learn about the different contributions of genetics versus the environment. For example, you know… traits of a person… not animals.. we'll strictly talk about humans genetics today although animal studies are quite interesting as well. Anyways…
11	Well, let's take a look at the data here. These numbers here suggest that for certain traits like BMI, or body mass index, monozygotic twins reared together and apart are not too different from one another. Even if they grew up on opposite sides of the world, under completely different circumstances, monozygotic twins tend to have very similar BMI. This suggests that there might be a little bit of an environmental component, but it is surprisingly very small. But… In contrast, when it comes to verbal ability, there is a sizable difference between monozygotic twins reared together versus reared apart, which suggests a very strong environmental component! At the same time, this verbal ability example also shows a strong genetic component because monozygotic twins reared together tend to be	Here are some results! We have more coefficients here. For BMI, which stands for body mass index, and monozygotic twins reared together is at .74, and monozygotic twins reared apart is at .70. Pretty high numbers here, which is not surprising. Then when you look at verbal ability, which includes things like spelling, vocabulary, grammar, and things like that, you can see that monozygotic twins reared together is at .76, which is considerably higher than monozygotic twins reared apart. And compared to that, you can see that dizygotic twins reared together is at an even

	way more similar than dizygotic twins reared together. Clearly, both genetics and environment play important roles on people's traits and outcomes, but as you can see, for some traits, one matters more than the other.	lower .43. Again, not surprising results.
21	All these super interesting findings led to what the scientists now refer to as the orchid versus dandelion hypothesis. And like I said before, it basically is the same thing as the plasticity hypothesis or sensitivity hypothesis – terms that we already covered in previous slides.	And now we have the orchid vs. dandelion hypothesis. Which are also called plasticity hypothesis or sensitivity hypothesis.